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SAMUEL YOUNG,

Secretary of State.

Albany, 1842.

ORDER OF THE WORK.

GENERAL INTRODUCTION.

PART I.

ZOOLOGY;

BY JAMES E. DE KAY.

PART II.

BOTANY;

BY JOHN TORREY.

PART III.

MINERALOGY;

BY LEWIS C. BECK.

PARTS IV. & V.

GEOLOGY AND PALÆONTOLOGY;

BY WILLIAM W. MATHER, EBENEZER EMMONS, LARDNER VANUXEM AND JAMES HALL.

ZOOLOGY

OF

NEW-YORK,

OR THE

NEW-YORK FAUNA;

COMPRISING DETAILED DESCRIPTIONS OF ALL THE ANIMALS HITHERTO OBSERVED WITHIN THE STATE OF NEW-YORK, WITH BRIEF NOTICES OF THOSE OCCASIONALLY FOUND NEAR ITS BORDERS, AND ACCOMPANIED BY APPROPRIATE ILLUSTRATIONS.

BY JAMES E. DE KAY.

PART I. MAMMALIA.

ALBANY:
PRINTED BY W. & A. WHITE & J. VISSCHER.

1842.

INTRODUCTION.

NEW-YORK is situated between 40° 30′ and 45° of north latitude, and between 5° 5′ of east and 2° 55′ of west longitude from the city of Washington. The state includes an area of 46,200 square miles, divided into fifty-nine counties, and subdivided into nine cities, eight hundred and thirty-five towns, and one hundred and forty-five incorporated villages; and contains 2,428,921 inhabitants; of whom 2,378,890 are free white persons, 50,027 are free colored persons, and four are colored slaves.* The government is a representative republic, with a written constitution, which was framed by a convention in 1821, and approved by the people in a popular election in 1822. The few remaining descendants of the aborigines are neither enumerated, nor admitted to citizenship. Persons of African descent, possessing freeholds worth two hundred and fifty dollars, enjoy the right of suffrage. Aliens are excluded until they become naturalized according to the laws of congress, after five years' residence in the United States. All male citizens who have attained the age of twenty-one years, and resided in the state one year,

* U. S. census, 1840.

vote for all officers elected by the people, and may be chosen or appointed to places of trust or profit; but the governor must be a native citizen of the United States, and a freeholder, aged not less than thirty years, and must have been an inhabitant of this state five years previously to his election, unless absent on public business; and only freeholders can be elected senators. Elections are conducted by ballot. The constitution guarantees the franchises of citizenship to every member of the state, unless he be deprived of them by the law of the land or the judgment of his peers. Among those franchises are trial by jury, the writ of habeas corpus, liberty of speech and of the press, and free enjoyment of religious profession and worship. The government can make no discrimination or preference of religion, nor any provision for an ecclesiastical establishment, and the clergy are excluded from civil functions. A militia composed only of citizens who are enrolled, and required to appear under arms twice in each year, constitutes the only force within the state, relied on for public defence or maintenance of the civil authorities; but the constitution of the United States guarantees to the state security against invasion and domestic insurrection. There are four departments of the government: the legislative, executive, administrative and judicial. The legislative power is absolute, except as restricted by the federal and state constitutions. A senate and an assembly constitute the legislature. The senate is composed of thirty-two members, who are elected by the people in eight equal senatorial districts, and remain in office four years. One senator is annually elected in each district. The assembly consists of one hundred and twenty-eight members, who are elected by the people in counties, each of which is represented in proportion to its population. The lieutenant-governor, elected by the people, presides and has only a casting vote in the senate. A speaker freely elected by the assembly presides in that body. Bills originate in either house, and become laws when passed by both houses and approved by the governor, or when they receive the votes of two-thirds of the members present notwithstanding the executive veto. Laws to create or alter corporations require the assent of two-thirds of all the members elected in each house.

The governor constitutes the executive department, is biennially elected by the people, is commander-in-chief of the militia and admiral of the navy, and is charged with the execution of the laws. He annually communicates to the legislature the condition of the state, and recommends such measures as he deems expedient. He is invested with power to pardon in all cases whatsoever, except treason, and may suspend the execution of persons convicted of that crime until the pleasure of the legislature shall be made known. In case of his death, absence or incapacity, the executive functions devolve upon the lieutenant-governor. The administrative department is intrusted with the fiscal interests of the state, and is divided among a secretary of state, comptroller, treasurer, surveyor-general, attorney-general, commissary-general, commissioners of the canal fund, commissioners of the land-office, and canal commissioners; each of whom, by virtue of the constitution or laws, is appointed by the legislature without the interposition of the executive authority. There is a court for the trial of impeachments and the correction of errors, which is composed of the lieutenant-governor, senators, chancellor, and the justices of the supreme court. Articles of impeachment may be preferred by the assembly against the governor and all administrative and judicial officers, and the votes of two-thirds of the members of the court for the trial of impeachments are necessary to a conviction. The court may remove the party convicted from office. The same court reviews the judgments and decrees of the supreme court and the court of chancery. The supreme court is a court of law, having jurisdiction in civil and criminal cases; and consists of three justices, each of whom holds his office until he attains the age of sixty years. Issues of fact are tried by jury before circuit judges who hold circuit courts, and by the county courts; and such issues in criminal cases are tried by jury in courts of oyer and terminer and general sessions in the several counties. The supreme court reviews the judgments of all inferior legal tribunals. County courts of common pleas and general sessions are held by local judges, who hold their offices five years, and review the proceedings in justices' courts. There are four justices of the peace in each town; they are elected by the people, and hold their offices four years, and have jurisdiction in

civil cases, and in litigated cases may render judgments not exceeding one hundred dollars. Three justices constitute a court of special sessions for the trial of small offences. Equity is administered by a chancellor and by nine subordinate vice-chancellors, of whom six are also circuit judges. The chancellor and circuit judges respectively hold their offices until the age of sixty years. All judicial officers, except justices of the peace in towns, are nominated by the governor, and appointed by him with the advice and consent of the senate. He also appoints in like manner major-generals, inspectors of brigades, and officers of the general staff of the militia, except the commissary-general. The constitution may be amended; and for that purpose a resolution must be passed by a majority of the legislature at one session, and at a succeeding session by the votes of two-thirds of all the members elected, and be approved at the next general election by a majority of the people. The present constitution was established in the place of one which had been adopted in 1777.

The Bay of New-York is supposed to have been visited by Verazzani, under the patronage of Francis I. of France, in 1584.* In 1609, Champlain, a mariner in the French service, explored the northern waters,† and Hendrick Hudson, under a commission from the States General of the Netherlands, ascended the river whose name so justly commemorates the enterprise of that navigator.‡ The settlement of the southern portion of the state, under the name of New-Netherlands, was commenced in the subsequent year. The colony submitted to the English in 1664,§ and was regained by the Netherlands in 1673,‖ but was relinquished to England by the treaty of Westminster in the succeeding year, and remained a province of the British empire until the thirteen united British colonies became an independent confederacy of states in 1776. During the Dutch supremacy, the province was a mercantile possession of the Dutch East India Company. Under the English, it was by royal charter a manor belonging to the Duke of York. In 1683, the discontent of the colonists induced the con-

* Bancroft. † Id. ‡ Id. § Id. ‖ Id.

sent of the proprietor to the institution of a representative assembly.* After that period, restricted legislative powers were vested in the governor and council "and the people met in general assembly."

Although the States General of the Netherlands were at the zenith of commercial power, and learning and the arts were cherished in that country, when the colony was planted, its inhabitants seem not to have been distinguished by intellectual acquirements;† and although the conquest occurred at a time when the English people had attained even an higher supremacy in literature than in arms, yet that event seems not to have resulted in an improvement of the condition of society.‡ Knowledge dawned upon the colony about the year 1754,§ but was obscured during the civil commotions which a little more than twenty years afterwards resulted in its political independence.

Columbia College was established by royal charter, under the name of King's College, in 1754, under the care of doctor Samuel Johnson of Connecticut, as president. The governors of the college were the archbishop of Canterbury, the first lord commissioner for trade and plantations, the lieutenant-governor of the province, and several other public officers, together with the rector of Trinity Church, the senior minister of the Reformed Protestant Dutch Church, the ministers of the German Lutheran Church, of the French Church and of the Presbyterian Church, the president of the college, and twenty-four of the principal gentlemen of the city. The college was endowed with funds derived from lotteries, and voluntary contributions of private individuals in this country, and in England and France. Dr. Johnson was succeeded as president in 1763, by the reverend Miles Cooper, D.D. of Oxford. He, in 1767, acknowledged that the institution had recently received great emoluments from his majesty king George III., from liberal contributions by many of the nobility and gentry in the parent country, from the Society for the propagation of the Gospel in foreign parts, and from several public spirited gentlemen in America and elsewhere. He gave also

* Bancroft. † Clinton, Introductory Discourse. ‡ Id. § Id.

this account of the success of the institution: "That the governors of the college had been enabled to extend its plan of education almost as diffusely as that of any college in Europe; there being taught therein divinity, national law, physic, logic, ethics, metaphysics, mathematics, natural philosophy, astronomy, geography, history, chronology, rhetoric; the Hebrew, Greek, Latin and modern languages; the belles-lettres, and whatever else of literature may tend to accomplish the pupils both as scholars and gentlemen." At the commencement of the revolution, the presidency devolved upon the right reverend Benjamin Moore, bishop of the Protestant Episcopal Church; and the chair has since been filled by William Samuel Johnson, doctor Wharton, William Harris and William A. Duer.* The fair beginning of education in the colony was arrested by the revolutionary war; and the college was not reörganized until 1787, when, under the immediate superintendence of the newly created regents of the university, the institution assumed the name of Columbia College, and its charter, with some necessary alterations, was confirmed.†

Education was recognized as among the proper responsibilities of the government in 1784, by an act "erecting an university within this state." What appears to have been chiefly intended by this act, was to convert King's, now Columbia College, into a state university. The principal officers of the state were made, ex-officio, regents, and twenty-four other persons were appointed, and it was provided that each religious denomination in the state might appoint one of its clergy to be a regent. The regents were empowered to establish colleges and schools, which should be considered as parts of the university. This law was amended in November of the same year, and was revised in 1787. The provision authorizing the clergy to appoint a regent proved impracticable, and was repealed. The constitution of the university is at present substantially such as it was made by this last revision.

Among the many distinguished patrons of learning who have held seats in the

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* Historical sketch of Columbia College, 1826. † Laws of New-York, 1784.

board of regents, may be named George Clinton, John Jay, Morgan Lewis, Daniel D. Tompkins, De Witt Clinton, Joseph C. Yates, Martin Van Buren, Enos T. Throop and William L. Marcy, former governors of the state; Pierre Van Cortlandt, Stephen Van Rensselaer, Jeremiah Van Rensselaer, John Broome, John Tayler, Erastus Root, James Tallmadge, Nathaniel Pitcher, Edward P. Livingston and John Tracy, former lieutenant-governors; Egbert Benson, Philip Schuyler, Ezra L'Hommedieu, Lewis Morris, Matthew Clarkson, Benjamin Moore, Eilardus Westerlo, Baron de Steuben, Gulian Verplanck, Zephaniah Platt, James Watson, Abraham Van Vechten, Simeon De Witt, James Kent, Henry Rutgers, Ambrose Spencer, Peter Gansevoort, Solomon Southwick, Smith Thompson, John Woodworth, John Lansing junior, Samuel Young, Nathan Williams, William A. Duer, Harmanus Bleecker, Samuel A. Talcott, Peter B. Porter, Robert Troup, Jesse Buel, Benjamin F. Butler, John Sudam, John P. Cushman and Washington Irving. The present regents are the governor; Luther Bradish, lieutenant-governor; Samuel Young, the secretary of state; Elisha Jenkins, James Thompson, Peter Wendell, John Greig, Gulian C. Verplanck, Gerrit Y. Lansing, John K. Paige, John A. Dix, William Campbell, Erastus Corning, Prosper M. Wetmore, James McKown, John L. Graham, Amasa J. Parker, John McLean, Joseph Russell, John C. Spencer, Gideon Hawley and David Buel.

Union College at Schenectady was established by the regents in 1795, after striking out a provision in the plan submitted, which declared that a majority of the trustees of the college should not, at any time, be composed of persons of the same religious sect or denomination.* The charter contained the singular provision that the clear annual value of the real property of the institution should not exceed thirteen thousand three hundred and thirty-three dollars; and declared that the trustees should not exclude any person on account of his particular tenets or religion, from admission into the college. In 1797, the trustees of the college, as appears from the report of the condition of the institution, gave instruction con-

* Proceedings of the Regents of the University.

cerning the constitution of the United States, and the several state constitutions, and proposed to substitute tuition in the French language for the Greek. In 1828, the trustees of the college reported that they had prescribed two distinct courses, the one embracing such classical studies as were usually pursued; and the other called the scientific course, substituting modern in the place of ancient languages, and including instruction in mathematics, anatomy, physiology, law, etc. Similar arrangements were about the same time made in the other collegiate institutions, but the classical course has nevertheless continued to be the chief form of instruction in these seminaries. The first president of Union College was the reverend John B. Smith, D.D. He was succeeded in 1799 by the reverend Jonathan Edwards, D.D., who died in 1801; when the reverend Jonathan Maxcy, D.D. was appointed, who retained the place until 1804. In that year the reverend Eliphalet Nott, L.L.D., succeeded to that office, which he yet retains. Among the patrons of this institution were Robert Yates, Abraham Ten Broeck, John Glenn, Stephen Van Rensselaer, Henry Walton, Joseph C. Yates, John Fry, Jonas Platt, Stephen N. Bayard, Theodore Romeyn, John V. Henry, Philip Van Rensselaer, Guert Van Schoonhoven, James Emott, James Duane, Samuel Blatchford, Jonas Coe, William James and Henry Yates.

Hamilton College, at Clinton, was founded by the regents of the university in 1812, under the care of the reverend Asahel Backus, D.D. as president. His successors have been the reverend Henry Davis, D.D., 1817; the reverend Sereno E. Dwight, D.D., 1833; the reverend Joseph Penny, D.D., 1835; and the reverend Simeon A. North, A.M., who assumed that office in 1839. Among the names of the distinguished patrons of the college are those of Simon Newton Dexter and William H. Maynard.

Geneva college was incorporated in 1825. Its first president was the reverend Jasper Adams, D.D. He was succeeded by the reverend Richard Sharp Mason in 1830; upon whose resignation in 1835 the reverend Benjamin Hale, D.D., was appointed to that office. Among the prominent patrons of the institution have been James Reese, Herman H. Bogart, William L. Dezang, John C. Spen-

cer, Abraham Dox, Francis Dwight, Bowen Whiting, David Hudson, Thomas D. Burrill, James Carter, Elijah Miller, Jesse Clarke, John C. Rudd, George Hosmer, David E. Evans, Joseph Fellows, Jonathan Childs, Abraham M. Schermerhorn, Samuel Clark, the right reverend B. T. Onderdonk and the right reverend William H. De Lancey.

The University of the city of New-York was established in 1830, under the care of the reverend J. M. Matthews, D.D. as its chancellor. The success and usefulness of the institution were for several years impaired by internal controversies which were not terminated until 1839, and by pecuniary embarrassments. Doctor Matthews having resigned, Theodore Frelinghuysen, L.L.D. was appointed his successor, and yet remains chancellor of the institution.

All these institutions have received liberal endowments from the state, and they educate annually about six hundred and fifty pupils. The colleges give instruction in moral, intellectual and political philosophy; in the Hebrew, Greek, Latin and modern languages and literature; in natural and experimental philosophy and chemistry; in mathematics, analytical mechanics and physical astronomy; in law, civil polity and history, and political economy.*

Clinton Academy in Suffolk county, and Erasmus Hall Academy in Kings county, incorporated in 1787, were the first academical institutions established by the regents of the university. Farmers' Hall Academy in Orange county, and

* Complaints are often made that the standard of university education has been lowered since its introduction among us; yet it cannot be admitted as in any sense true, that the amount of knowledge communicated is less now than at any former period. On the contrary, the assiduity of both instructors and pupils, as well as the facility of instruction, have been continually increased. The change which has taken place consists in a diminution of classical learning and of mental science and logic, and, perhaps, of moral and political science, and a substitution of more extensive instruction in physical science and practical mathematics. This change has resulted from the operation of our social system. Collegiate education, instead of being reserved for the few, who, favored by fortune, might desire to prosecute recondite and classical studies during and after their course, and to enter at leisure upon the duties of active life, or refrain from them altogether, is now attainable by persons in almost every class, and is sought not so much for the sake of knowledge itself, as because it is among the means of preparation to enter the professional pursuits. Perhaps, therefore, our system of collegiate education produces proportionably a smaller number of finished scholars, while it secures to the country a larger body of useful citizens. Nevertheless beneficent as the general flow of knowledge is, those who have the care of its fountains deserve well of the country for every effort to preserve them full of pure learning. The labors of the Rev. Dr. Hale, president of Geneva College, and his associates; of the Reverend Dr. Alonzo Potter of Union College, and generally of the faculty and trustees of Columbia College, in this respect, merit especial commendation.

North Salem Academy in Westchester, were established in 1790. Montgomery Academy, then in Ulster but now in Orange county, was incorporated in 1791. Dutchess Academy at Poughkeepsie, and Union Hall in Queens county, received their charters in 1792. In 1820, the number of academies subject to the visitation of the regents had risen to 30; in 1830, to 55; in 1841, to 127; and the number at this time is 131. In 1820, the number of pupils in all the academic institutions was 2,218; in 1830, 3,735; in 1840, 10,881; and the present number is 11,306.* The income of the public literature fund distributed to the several academies in 1820, was two thousand five hundred dollars, being in the proportion of three dollars and ninety three cents to each pupil pursuing classical studies; in 1830, it was ten thousand dollars, or five dollars to every such pupil; and the amount now annually distributed is forty thousand dollars, being about three dollars and seventy-eight cents for every such pupil.†

No especial public patronage was bestowed upon female education until 1821, when the legislature incorporated the Albany Female Academy, and conferred upon it a donation of one thousand dollars. A law of 1827, increasing the literature fund and extending to scholars in the higher branches of English education the advantages before enjoyed exclusively by those pursuing classical studies, resulted in admitting to a participation in the benefits of that fund, institutions devoted either entirely or in part to the education of females. The number of female pupils who, at the time that law was passed, enjoyed the benefits of academic instruction under the sanction of the regents, was one hundred and fifteen; the number at the present time is fifteen hundred and seventy. Institutions exclusively devoted to female education, and subject to the visitation of the regents, have been founded in Albany, Canandaigua, Poughkeepsie, Troy, Schenectady, Utica, Batavia, Rochester, New-York, Auburn, Le Roy, Fulton and Albion. In these institutions, instruction is given in arithmetic, algebra, botany, Biblical anti-

* Minutes of the Regents of the University.

† Notes concerning colleges and academies were received from GIDEON HAWLEY, L.L.D.

quities, callisthenics, chemistry, composition, conic sections, criticism, drawing, embroidery, ecclesiastical history, the French language, geography, geology, history, logic, music, mechanics, mineralogy, natural history, natural philosophy, moral and intellectual philosophy, painting, rhetoric and technology.

For the impulse which the public mind has received in favor of female education, it is only just to acknowledge obligations to Mrs. Emma Willard of Troy, the founder of the first successful institution on a scale commensurate with the importance of the object; and to James Kent, John N. Campbell and their associates, the founders and patrons of a similar institution at the capital.* It is also due to the conductors and patrons of the female academies, to acknowledge, that with far less pretension and more limited public aid than our colleges, they are successful in maintaining a high standard of pure education; and that their pupils exhibit proficiency and acquirements comparing favorably with the best results of collegiate education. The female academies have very careful public examinations and annual celebrations, in which essays written by pupils are read by persons appointed for that purpose, and medals and other testimonials of merit are awarded. The benign influences of these institutions are already observable in the more frequent employment of women as instructors of youth, in the increasing respect which the sex receives, and in the greater refinement of society.

The tendency, however, of a popular government, is to favor rather the diffusion of general knowledge, and that which is immediately useful, than the advancement of pure science, and the cultivation of liberal and ornamental arts.

In a community where each individual shares the responsibilities of government, there is an obvious necessity for universal education. This principle may be discerned in the earliest legislation at the close of the revolution. In 1789, two lots were set apart in each township of public lands, to constitute a local fund for the support of religious instruction and popular education. The regents of the university, in 1793, submitted to the legislature the importance of "insti-

* Notes concerning female education were furnished by A. CRITTENTON, Principal of the Albany Female Academy.

tuting schools for the purpose of instructing children in the lower branches of education." The recommendation was renewed in 1795, with the sanction of George Clinton, then governor. The legislature in the same year appropriated twenty thousand pounds ($50,000) annually for five years, out of the public revenue, to encourage and maintain, in the several cities and towns, schools, in which the children of the inhabitants residing in the state should "be instructed in the English language, or be taught English grammar, arithmetic, mathematics, and such other branches of knowledge as are most useful and necessary to complete a good English education." The boards of supervisors were required to raise by tax in each town, a sum equal to one-half of its proportion of the moneys appropriated by the state; and commissioners and trustees were directed to be appointed, and required to make annual reports to the secretary of state.

The returns made in 1798, showed that 1,352 schools had been established, and 59,660 children had been instructed therein in sixteen of the twenty-three counties into which the state was then divided. Mr. Comstock, a representative from Saratoga in the assembly of 1800, made an unsuccessful motion that the then expiring law of 1795 should be continued. The law therefore was suffered to expire; and notwithstanding the earnest and repeated representations of governor Clinton, the legislature omitted to adopt any measure for the reëstablishment of common schools until 1805, when a law was passed, declaring that the nett proceeds of five hundred thousand acres of public lands should be devoted to the creation of a permanent fund for the support of common schools. The act directed that the lands should be sold, and the moneys derived therefrom loaned and suffered to accumulate, until the interest arising thereon should amount to fifty thousand dollars annually; after which period, the annual interest should be distributed for the support of common schools. The measure received important aid from the recommendation of Morgan Lewis, who then filled the executive chair. The fund thus established produced an income in 1810 of twenty-six thousand dollars; and Daniel D. Tompkins, then governor, in two successive annual speeches, urged the importance of an immediate organization of the com-

mon schools. A law was passed in 1811, authorizing the governor to appoint commissioners to devise a system for that purpose. Jedediah Peck, John Murray junior, Samuel Russell, Roger Skinner and Robert Macomb were appointed such commissioners; and in 1812, they submitted to the legislature a report, which was adopted, and is the basis of the existing system of common schools.

The fund was increased in 1819, by various appropriations, which raised its productive capital to about $1,200,000. The new constitution, adopted in 1821, not only declared the school fund to be inviolable, and guaranteed its perpetual application, but added to it all the unappropriated public lands. Forty thousand dollars were added to the fund in 1824; and in 1827, other appropriations were made to the amount of about $180,000.* In 1838, an annual appropriation of $110,000 was added to the income of the fund, and the principal was also considerably augmented. The invested and productive capital of that fund is now $2,036,625. The sum annually distributed from the state treasury in support of common schools, is $261,000. Adding to the principal the unsold lands, valued at $200,000 and principal moneys sufficient to yield an interest equal to the amount annually appropriated from the treasury, beyond the income of the invested and productive capital, the entire capital would be $5,820,000. The whole capital permanently invested for the support of education in colleges, academies and common schools, including all endowments, contributions from the treasury, and moneys derived from taxation in the school districts, is $10,500,000.†

The chief features of the common school system, are the annual election of commissioners of common schools by the people in the several towns; the division of towns by the school commissioners, into school districts; the election of trustees in such school districts, by the inhabitants thereof; the erection and maintenance of a school house in each district, with funds derived from the tax levied upon the inhabitants by the trustees, in pursuance of a resolution passed at an annual meeting of the inhabitants; the employment of teachers whose qua-

* Report of A. C. Flagg, superintendent of common schools. † Governor's message, 1812.

lifications are approved by inspectors elected by the people; a contribution by means of taxation in each school district, of a sum equal to that apportioned to the district out of the public funds; the supplying of any deficiency in the funds necessary for the support of the schools, by the charging of tuition fees upon such parents and guardians as are of sufficient ability; the exemption of the poor from all charges for tuition fees; the maintenance of a school in each district, not less than four months in each year; the visitation and examination of schools by the inspectors, and by a deputy superintendent of common schools for the county, the latter officer being appointed by the supervisors; and a supervision and care of the entire school system of the state, by the secretary of state, who is superintendent of common schools, and to whom annual reports of the condition, progress and statistics of each school district are made by the trustees thereof; the maintenance of schools wherever necessary for the education of children of African descent; the maintenance of normal schools in the most flourishing academical institutions, for the instruction of teachers of both sexes; the publication and distribution to each school of a periodical journal, exclusively devoted to the cause of education and not of a sectarian or party character, and in which are published the laws of the state, the regulations established by the superintendent, and his decisions upon questions affecting the organization, administration and government of the schools; and a comprehensive annual report to the legislature by the superintendent, of the condition of the schools throughout the state.*

The whole number of school districts in the state is 10,886, in which schools are maintained during an average period of eight months in each year. The number of children instructed is 603,583. The whole amount of money expended for the payment of wages of teachers is $1,043,000; of which $560,000 are public money, and the remainder is contributed by individuals.†

It is apparent that the efficiency of the public school system must depend in a great measure upon the ability, zeal, and efficiency of the superintendent of

* Laws of New-York, 1841. † Annual report of S. S. RANDALL, deputy superintendent of common schools, 1842.

common schools. That office was filled in 1813 by the appointment of Gideon Hawley, who gave place in 1821 to Welcome Esleeck. Mr. Esleeck held the office only a few months; it then devolved upon John Van Ness Yates, who retired in 1826, when Azariah C. Flagg succeeded to that trust, and retained the same until 1833. Mr. Flagg was succeeded by John A. Dix, who gave place in 1839 to John C. Spencer. Mr. Spencer retired in 1842, and the place is now filled by Samuel Young. To Gideon Hawley is justly ascribed the merit of organizing the system, and bringing it into successful operation; to John Van Ness Yates, that of an assiduous and enlightened administration; to John A. Dix, that of codifying and interpreting upon fixed and enlightened principles the vast body of school laws; and to Azariah C. Flagg and John C. Spencer, high praise is awarded for earnest and well-directed efforts to remove obstacles which prevented the system from becoming such as its founders originally proposed it should be: an uniform plan of universal education, as well as in the cities in the country. The latter gentleman, during his occupancy of the office, induced the legislature to revise the entire system, and increase its efficiency and usefulness by important amendments and improvements, and especially by those which secure more effectual visitation of the common schools by the appointment of local superintendents. The enlightened efforts of George Clinton, of Lewis and of Tompkins, have been already acknowledged. Nor was less zeal exhibited by De Witt Clinton and William L. Marcy, successors in the executive office. To William A. Duer the system is much indebted, for his successful efforts in inducing the legislature to make the support of schools by the people, with public aid, compulsory.

The maintenance of school district libraries may now be regarded as a cardinal feature of the system of primary education; an improvement which, if not suggested, was brought into public favor through the patriotic efforts of James Wadsworth of Geneseo, aided and sustained by William L. Marcy, under whose administration this important project was carried into successful operation. Bountiful and widely extended as the provision for this system seems to be, the

people of the state of New-York are scarcely enjoying its first fruits. When it is remembered that knowledge exerts a self-expanding and self-regenerating power, and that the relations not only among the several American communities, but between all regions of the earth, are becoming more and more intimate, it is perhaps not presumptuous to suppose that the ripened fruits of the plan are to be developed in the intellectual, moral and social improvement of the whole human family.*

The first notice of a library which we meet, bears date an hundred and fourteen years ago; when an association in England, called the "Society for the Propagation of the Gospel," transmitted to Richard Montgomerie, governor of the province, a thousand volumes, a gift from Dr. Millington, rector of Newington.† The society informed the governor, that the books were intended as a library for the use of the clergy and gentlemen of New-York, Connecticut, New-Jersey and Pennsylvania; and requested that the assembly would provide a depository. The subject was referred to the corporation of the city of New-York, who assigned an apartment in the city hall. In 1754, the sum of six hundred pounds was subscribed by an association in the city of New-York, and expended in the purchase of seven hundred volumes of "new and well chosen books." The society was incorporated in that year; and it was expected that its collection, containing the two libraries which have been mentioned, would, by further contributions, "become vastly rich and voluminous." The society still exists, and its library, now amounting to forty thousand volumes, proves that the expectations of its founders have been fully realized. Notwithstanding, however, the advantages thus enjoyed by the citizens of the embryo metropolis, the historian, in 1762, gave this unfavorable account of the intellectual condition of the colonists: "Their schools are in the lowest orders; the instructors want instruction; and through a long shameful neglect of all the arts and sciences, the common speech is extremely

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* Notes concerning common schools were received from Gideon Hawley, L.L.D., and Samuel S. Randall, Esq. the deputy general superintendent.

† American Gazetteer, 1762.

corrupt, and the evidences of a bad taste, both as to thought and language, are visible in their proceedings public and private. There is nothing the ladies so generally neglect as reading, and indeed all the arts for the improvement of the mind — a neglect in which the men have set the example."*

The legislature, in 1796, passed an act by which, after reciting that a disposition for improvement in useful knowledge had manifested itself in various parts of the state, and for procuring and erecting social and public libraries, and that it was of the utmost importance to the public that the sources of information should be multiplied, and institutions for that purpose encouraged and promoted, provision was made for the incorporation of public library associations. Valuable libraries were established under this law in many of the principal towns; and they were exempted by a subsequent act, and still remain free from taxation.

A state library, deposited in the capitol, was commenced in 1818. The law department therein contains 4,273 volumes; and the scientific, literary and miscellaneous division contains 4,218 volumes. The collection has been enriched by very munificent donations from the government of Great Britain; and the selection, which has hitherto been made with great care, is now continually increased by means of annual legislative appropriations of about three thousand dollars.

But the most important public measure in relation to libraries, was the act before referred to, by which the sum of $55,000 of public money was annually for five years devoted to the establishment of a school library in each of the eleven thousand school districts in the state. Each district was moreover obliged to raise a sum equal to that apportioned to it from the treasury; so that the amount devoted to the establishment of these collections, which, as they are distributed so as to bring a library within the reach of every family, may be called domestic libraries, is $550,000. The Messrs. Harpers, publishers in New-York, acting in harmony with the intentions of the legislature, have already issued from their press two hundred volumes, constituting a series of popular works, chiefly by

* American Gazetteer, 1762.

native authors, on subjects in the various departments of science and literature, and especially designed for these libraries. Mr. Wadsworth, already honorably mentioned, continues to favor the enterprise by an annual contribution to the writers of such works as are approved by the superintendent of common schools. By a law of 1841, each academy receives from the treasury a sum of about two hundred and fifty dollars; which, together with an equal amount contributed by the founders and patrons of the institutions, is applied to the purchase of text books, globes, maps and philosophical apparatus.

During the Dutch government, no press was established; and so late as 1686, Governor Dongan was instructed to allow no such establishment in the colony.*

The great English revolution of 1688, and the accession of William and Mary, were hailed with enthusiasm in the colonies, and awakened in New-England and New-York an earnest desire to repossess the rights and franchises which had been wrested by the Stuarts, or tamely yielded to their rapacity. The popular mind did not then suspect that the despotism of absolute monarchy had only given place to the omnipotence of parliament. Although a press had been established for scientific and literary purposes at Cambridge, in Massachusetts, about the middle of the seventeenth century, printing was not commenced in Boston, Philadelphia or New-York, until near the close of that century; nor was any newspaper printed in the American colonies before the year 1700. Dr. Cadwallader Colden, often mentioned in this memoir, in a letter written in 1743 to Dr. Franklin, minutely explained an improvement he had conceived in the art of printing, which was identical with the stereotype process introduced into France nearly sixty years afterwards by Mr. Herhan, under letters patent from Napoleon. Dr. Colden's letter was published in Hosack and Francis' American Medical and Philosophical Register, in 1810. But it is only just to say, that subsequent researches have resulted in showing that a bible was printed by Gillett, with ste-

* Clinton's Introductory Discourse.

reotype plates, in Strasburgh, twenty years at least before the improvement suggested itself to Dr. Colden.*

The first newspaper which appeared in the colony of New-York was the "New-York Gazette," by William Bradford, in 1725. It was the fifth then in existence in the American colonies; three having already been established in Massachusetts, and one in Philadelphia. Bradford was said to have fled from Philadelphia to New-York. He had given offence by publishing a paper written by George Keith. Keith had been condemned by the city meeting of friends for a doctrine which he maintained, and appealed to the general meeting of that society, and published an address concerning the controversy. The address was denounced as seditious, and Bradford was arrested and imprisoned for printing it. The trial of Bradford is a curious and not an uninstructive illustration of the spirit of the age, and of the imperfect notions of the liberty of the press which prevailed at that day. Keith was adjudged guilty, both in the ecclesiastical and civil courts without a hearing; and one of the judges having declared that the court could judge of the matter of fact without testimony, directed the common crier to "proclaim, in the market place, the accused to be a seditious person, and an enemy to the king and queen's government." Bradford and Macomb, an associate, were charged with circulating the offensive pamphlet, and demanded a speedy trial as a right secured by magna charta. Being members of the society of friends, they appeared in court covered. Justice Cooke inquired, "What bold, impudent and confident men are these to stand thus confidently before the court?" Bradford replied, "We are here only to desire that which is the right of every free born English subject, which is speedy justice; and it is strange that that should be accounted impudence." Justice Cooke answered, "If thou hadst been in England, thou would have had thy back lashed before now." The prisoners continued to press for a trial. Justice Cooke replied, "A trial thou shall have, and that to your cost, it may be." When the trial came on, Bradford asked

* Hinton.

that he might have a copy of the presentment, and be informed under what law he was prosecuted; but these requests were denied. During the trial, "the grand jury sat by the prisoners overawing and threatening them, when they spoke boldly in their own defence, and one of the grand jurors wrote down such words as they disliked, signifying that they would present them. Justice Cooke bade the grand jurors take notice of such and such words." When the prisoner's counsel began to say something in regard to the matter, the court directed an officer to take him away. The attorney for the prosecution concluded by saying, "It was evident William Bradford printed the seditious paper, he being the printer in this place, and the frame on which it was printed was found in his house." Bradford then said, "I desire the jury and all present to take notice, that there ought to be two evidences to prove the matter of fact, but not one evidence had been brought in this case." Justice Jennings answered, "the frame on which it was printed is evidence enough." Bradford replied, "But where is the frame? There has no frame been produced here; and if there had, it is no evidence unless you saw me print on it." To which justice Jennings answered, "The jury shall have the frame with them; it cannot well be brought here; and besides the season is cold, and we are not to sit here to endanger our health." The jury, however, after remaining out sixty hours, resisted all the efforts of the court, disagreed, and were discharged. Soon after this trial, Bradford having in some manner obtained a release, appeared in New-York. The sedition of the publication consisted in the inquiry, whether the Friends, in sending out armed commissions against piracy, did not transcend the requirements of their religious profession.

Thus the foundation of the press in New-York may be said to have been laid in the maintenance or assertion of its primary rights and liberties. On arriving at New-York, Bradford became printer to the government, which station he held for many years; and such is the infirmity of our nature, that at a later period, when the only rival press in the colony had assumed an attitude opposed to the local government, and was sought to be crushed by prosecution and imprisonment, he was found on the side of power and privilege, and against the enfranchisements

of speech for which he had contended forty years before. Bradford established the first paper mill in New-Jersey, and the first perhaps in America. He was about seventy years old when he began the publication of the Gazette, and continued in the active duties of the paper for sixteen or seventeen years. The Gazette was continued after 1742, with the additional title of the "Weekly Post Boy" until 1773.

John Peter Zenger established in 1733 the "New-York Weekly Journal," the second newspaper in the colony. It opposed the administration of governor Cosby, and supported the interest of Rip Van Dam, who had previously conducted the administration. Zenger maintained an effective battery. "The ballads, serious charges, and, above all, the home truths in his democratic Journal, irritated Cosby and his council to madness." Zenger was confined several months by order of the governor and council, for printing and publishing seditious libels; treated with unwarrantable severity; deprived of pen, ink and paper, and denied the visits of his friends. The popular feeling, however, was strongly against these proceedings. The assembly, notwithstanding the application of the governor, refused to concur with him and his council. The mayor and the magistrates also refused to obey the mandate of the governor and council, and to attend the burning of the libellous papers "by the common hangman and whipper, near the pillory." The grand jury manifested equal contumacy, and ignored the presentment against Zenger. The attorney-general was then directed to file *an information.* The judges refused to hear and allow the exceptions taken by Zenger's counsel, and excluded them from the bar; but he was ably defended by other counsel, and especially by Andrew Hamilton, then a barrister of Philadelphia. Zenger pleaded not guilty. His counsel admitted the printing and publishing of the papers, and offered to give their truth in evidence. The counsel for the prosecution then said, "The jury *must* find a verdict for the king," and gave the usual definition of a libel; asserting that, "whether the person defamed was a private man or magistrate, whether living or dead, whether the libel was true or false, or whether the party against whom it was made was of good or evil fame, it was nevertheless a libel." He then quoted from the Acts of the Apostles, and

from one of the epistles of Peter, to show that it was a very great offence to speak evil of dignities;" and insisted upon the criminality by the "laws of God and man, of reviling those in authority, and consequently that Mr. Zenger had offended in a most notorious and gross manner, in scandalizing his excellency our governor, who, said the counsel, is the king's immediate representative and supreme magistrate of this province." Mr. Hamilton remarked in his reply, that we are charged with printing and publishing a certain *false*, malicious, seditious and scandalous libel. The word *false* must have some meaning, or else how came it there; and he put the case, whether if the information had been for printing a certain *true* libel, would that be the same thing? "And to show the court that I am in good earnest," said he, "I will agree, that if he can prove the facts charged upon us to be *false*, I will own them to be scandalous, seditious and a libel." He then further offered, that to save the prosecution the trouble of proving the papers to be false, the defendant would prove them to be true. To this, chief justice De Lancey objected, "You cannot be admitted to give the truth of a libel in evidence; the law is clear that you cannot justify a libel." Mr. Hamilton maintained, that leaving the court to determine whether the words were libellous or not, rendered juries useless or worse. "It was true," he said, "in times past, it was a crime to speak truth, and in that terrible court of star-chamber many worthy and brave men suffered for so doing; and yet even in that court, and in those bad times, a great and good man durst say, what I hope will not be taken amiss in me to say in this place, to wit, 'The practice of information for libels is a sword in the hands of a wicked king and an arrant coward, to cut down and destroy the innocent. The one cannot, because of his high station, and the other dare not, because of his want of courage, defend himself in another manner.'" * The jury, after a short consultation, returned a verdict of not guilty, to the great mortification of the court and of Zenger's persecutors, but with great satisfaction

* Nearly 70 years afterwards, another Hamilton maintained this great and now undeniable principle with eloquence and power, which may be said to have conquered at last this great concession to the liberty of the press.

to the people. The common council of the city conferred upon Mr. Hamilton the public thanks and the freedom of the corporation, for that signal service which he cheerfully undertook under great indisposition of body, and generously performed, refusing either fee or reward.*

Such was the struggle which the press had to maintain only one hundred years ago, and only forty years before the revolution gave to its freedom the sanction of government and the impress of authority. Gouverneur Morris, in speaking of these occurrences to Dr. Francis, remarked, "that the trial of Zenger was the germ of American freedom, the morning star of that liberty which subsequently revolutionized America." Zenger died in 1746. His newspaper was conducted by his widow, and afterwards by his son, until 1752, when it was discontinued. The "New-York Gazette and Weekly Post Boy" was revived by James Parker in 1742, and was continued by successive proprietors until 1773. It was ably conducted, and had an extensive circulation; and though free, never transcended the bounds of decorum as they were defined at that day. The paper combated the stamp act, and with several contemporaries throughout the colonies, appeared in mourning on the 21st of October, 1765, on account of the passage of that law. The "New-York Evening Post" appeared in 1746, but was soon discontinued. The New-York Mercury was commenced by Hugh Gaine, and was discontinued at the close of the revolutionary war, after an existence of thirty-one years under the patronage of its founder. William Wyman, in 1759, established the "New-York Gazette," which, after a fitful existence, expired in 1767. The American Chronicle was commenced by S. Farley in 1761, and discontinued the next year; and the "New-York Packet," begun in 1763, had only a brief existence. In 1766, John Holt issued "The New-York Journal and General Advertiser;" and in 1768, "The New-York Chronicle" was commenced by Alexander and James Robinson, and continued until 1772, when the printers removed to Albany, and established there "The Albany Post Boy," which continued until 1776. James

* Dunlap's History of New-York.

Rivington, in 1773, commenced his newspaper career with a large and handsome sheet bearing the comprehensive title of "Rivington's New-York Gazeteer, or the Connecticut, New-Jersey, Hudson's River and Quebec Weekly Advertiser;" and in January, 1776, the publication of the New-York Packet and American Advertiser was begun by Samuel Loudon.

At the advent of the revolution, therefore, there were only four newspapers in existence in the colony, to wit, Gaine's Mercury, Holt's Journal and Advertiser, Rivington's Gazeteer, and Loudon's Packet; and as these reflect the spirit of that epoch, and are characteristic of the phases of the mighty struggle, a few facts in relation to them may not be thought devoid of interest. Gaine, who was a native of Ireland, continued to print and sell books in Hanover square until his death in 1807, a period of nearly sixty years. Exact, punctual and industrious, he acquired a large estate, and transmitted a reputation for personal honesty, thrift and tact, not often disturbed by excessive aspirations of patriotism. Approaching the revolution, he was ostensibly neutral; but with a desire to keep the strongest side, he alternately printed for the people and for the loyal authorities, as each seemed to preponderate. Although he removed with his press to New-Jersey on the approach of the British army, he returned when they had gained possession of the city; and emboldened by their successes, pursued the natural impulses of his mind, and gave to the royal cause the best efforts of his pen and press. His request to be allowed to remain in the city after its evacuation by the British army was granted; but his traits of character were happily hit off in a poem which appeared on the 1st of January, 1783, professing to be the humble petition of Gaine to remain in the city, in which his early profession and attachment to the cause of the country, his subsequent adhesion to the royal cause, and his final appeal were humorously and satirically described. It concluded,

> "As matters have gone, it was plainly a blunder,
> But *then* I expected the whigs must knock under,
> And I always adhere to the sword that is longest,
> And stick to the party that's like to be strongest."

The Mercury, of course, did not survive the revolution.

Rivington was an English bookseller, a man of the world and of good talents, who established his business in New-York in 1761, and in 1773 commenced the publication of the Gazette on a large medium sheet folio. The paper surpassed its contemporaries in enterprise, and in its original essays and its various intelligence; and soon came to be extensively patronized in all the principal towns. But when the king's arms were substituted for the early vignette, and the descriptive words in the title, "ever open and uninfluenced," were erased, and the paper gave unequivocal demonstrations of hostility to the popular cause, a body of armed men from Connecticut, in November, 1775, entered the city on horseback, beset the printer's habitation, destroyed his press, and threw his types into heaps or converted them into bullets. Two years afterwards, he returned from England with new materials, and renewed his paper, which now appeared twice a week on a sheet of royal size, surmounted with the royal arms, and entitled "The Royal Gazette, published by James Rivington, printer to the king's most excellent majesty." This paper was conducted with exceeding virulence against the "rebels." It was the leading royal press in the colonies, issued from the chief seat of British power, and attained precedence as the acknowledged official organ, and necessarily became very obnoxious to the prevailing party. At length foreseeing the result, Rivington sought to conciliate the whigs, and succeeded so far as to ensure the toleration of his residence in the city; but his paper, although it discarded the emblems and appendages of royalty, expired in 1783. The wits and satirists of the revolutionary press conferred an unenviable immortality upon its editor.

But there are more grateful aspects in the history of the republican press devoted to the cause of the country. The New-York Journal and Advertiser, published by Holt and Parker, bore a conspicuous part in the discussions and agitations of the day, animating the people in their resistance to tyranny, and preparing them for the trials and sufferings of the great struggle. At the memorable period of the stamp act, Holt, who then conducted the paper, added to its title the significant motto, "the united voice of all his majesty's free and loyal subjects in America, liberty, property, and no stamps." In 1774 Holt dis-

carded from the Journal the cut of the king's arms, and substituted in its stead the device of a snake severed into parts, with the motto "unite or die."* If Rivington suffered at the hands of the exasperated colonists, Holt was visited with the royal vengeance in forms scarcely less destructive. On the approach of the British army in 1776, he was obliged to quit the city and leave his property to be destroyed by the enemy. After a short interval, the Journal reappeared in Kingston. Driven thence by the capture and destruction of that place in the same year, Holt continued the paper at Poughkeepsie until the termination of the war, when he returned to New-York. He died in 1784. His paper, continued by his widow and descendants several years, at length passed into the hands of Thomas Greenleaf.

Early in the present century, the well known "American Citizen," edited with distinguished ability by James Cheetham, appeared. The New-York Packet, by Samuel Loudon, a native of Ireland, was a spirited auxiliary of the popular cause. That Journal was published at Fishkill while the city of New-York was in possession of the enemy.

During the same period, Robertson & Co. of the Royal American Gazette, and Lewis of the New-York Mercury and General Advertiser, made such an arrangement with the publishers of the other papers as to form a daily publication. But these newspapers were all discontinued at the peace of 1783. There were, therefore, at the close of the revolutionary war, nearly one hundred and fifty years after the introduction of printing in Massachusetts, and nearly a century after its establishment in Pennsylvania, only three newspaper publications in the state of New-York. These were Holt's and Loudon's, then respectively published at Poughkeepsie and Fishkill, and the New-York Gazetteer, which was commenced in Albany in May, 1782, by Valentine & Webster, and was succeeded two years afterwards by the Albany Gazette, published by Charles R. Webster, and has been continued by him and Websters & Skinners until the

* THOMAS' History of Printing.

present date, 1842. Thirty-nine newspapers were printed at the commencement of the revolution in all the American colonies.

The earlier newspaper press was extremely circumscribed in its scope and powers. A newspaper rarely exceeded in size half a sheet of foolscap. It was a mere compilation, often crude enough, with "the freshest advices foreign and domestic." How "fresh," the reader, in this day of railroads, steam packets, and second and third daily editions, will learn not without amusement, from the fact that sixteen years after a newspaper was established in Boston it proposed to issue a half sheet every other week; by which hazardous enterprise it was hoped that the time between the paper and the latest European news, then thirteen months, might be reduced to five. For many years the "Boston News Letter" contained no more than two advertisements. Until the close of the revolution, no newspaper was issued oftener than once a week; but with the progress of political events, the press assumed a higher position, and put forth greater energies. It was yet restricted, its rights scarcely understood, its power not appreciated, and its freedom curtailed by judicial decisions; nevertheless, it was advancing in character and importance. The trial of Zenger, the passage of the stamp act, the claim of parliamentary right to tax the colonies without representation and without consent, and the resistance to those claims on great principles, called forth the patriotism of the colonists; and the press. having then become the organ of an indomitable spirit of freedom, assumed a more elevated tone, and exerted a powerful influence in carrying the cause of the revolution to its triumphant consummation.

So rapid was the increase of newspapers, that in 1810 the number of such publications in the United States amounted to three hundred and fifty-nine, of which sixty-six were printed in this state. These journals, like those published during the revolution, with rare exceptions, were controversial, and of a political and partizan character. The ability displayed in their columns exceeded that which the press exhibited during the revolution, in a proportion equal to the sphere to be supplied; but the public taste had not yet become sufficiently refined

to reject invective, and to choose always facts and arguments in preference to scandal and recrimination. One or more newspapers were then published in the capital of each county, and their names will recal quite vivid recollections of the civil and political divisions of the state, as they then existed.

In the city of New-York there were seven daily newspapers: The New-York Gazette and General Advertiser by Lang & Turner, the New-York Evening Post by William Coleman, the Commercial Advertiser by Zachariah Lewis, all of which supported the federalist party; the Public Advertiser and the Columbian edited by Charles Holt, devoted to the republican party; and the American Citizen by James Cheetham, and the Mercantile Advertiser, which were neutral as to politics. There were also published in the city one semi-weekly and five weekly papers; these were the New-York Herald, the Spectator, the Republican Watchtower, the New-York Journal, the Columbian for the country, and the Price Current. In the city of Albany there were three semi-weekly newspapers: The Albany Gazette by Websters & Skinners, the Balance and New-York State Journal by Croswell & Frary, engaged in defending the policy of the federalists; and the Albany Register by Solomon Southwick, maintaining the republican cause. All the other newspapers in the state were published weekly, and were as follows: At Sag-Harbor, the Suffolk Gazette, a republican paper by Alden Spooner; at Brooklyn, the Long-Island Star, of the same politics, by Thomas Kirk; at Saratoga, the Saratoga Gazette; at Watertown, the American Eagle, by Henry Coffeen; at Peekskill, the Westchester Gazette, a republican paper by Robert Cromble; at Somers, the Somers Museum, a federal journal by Milton F. Cushing; at Goshen, the Orange County Gazette, a republican paper by Hopkins & Heron, and the Spirit of Seventy-six and Patriot, by Timothy B. Crowell; at Newburgh, the Political Index, a republican paper by Ward M. Gaslay; at Kingston, the Ulster Gazette, a federal paper by Samuel S. Freer, and the Plebeian, a republican journal by Jesse Buel; at Poughkeepsie, the Political Barometer, republican, by Joseph Nelson, and the Poughkeepsie Journal, federal, by Paraclete Potter; at Hudson, the Northern Whig, federal, by Francis Steb-

bins, and the Bee, republican, by H. Holland; at Catskill, the American Eagle, federal, by M. Elliot & Co., and the Catskill Recorder, republican, by Macky Croswell; at Lansingburgh, the Lansingburgh Gazette, by Tracy & Bliss; at Troy, the Troy Gazette, a federal paper by Eldad Lewis, also the Farmers' Register, a republican paper by Francis Adancourt, and the Northern Budget, neutral, by Oliver Lyon; at Salem, the Northern Post, federal, by Dodd & Rumsey, and the Washington Register, republican, by John P. Reynolds; at Plattsburgh, the American Monitor, republican, by George W. Nichols; at Waterford, the Waterford Gazette, by Horace H. Wadsworth; at Ballston, the Advertiser, republican, by Samuel R. Brown, and the Independent American, federal, by William Childs; at Schenectady, the Mohawk Advertiser, federal, by Ryer Schermerhorn, and the Schenectady Cabinet, republican, by Isaac Riggs; at Johnstown, the Montgomery Republican, federal, by Asahel Child, and the Montgomery Monitor, republican, by Daniel C. Miller; at Herkimer, the Bunkerhill, republican, by George Gordon Phinney, and the American, federal, by J. H. & H. Prentiss; at Utica, the Utica Patriot, federal, by Ira Merrell, and the Columbia Gazette, republican, by Thomas Walker; at Oxford, the Chenango Patriot; at Cazenovia, the Pilot, republican, by Baker & Newton; at Peterborough, the Freeholder, federal, by Jonathan Bunce & Co.; at Manlius, the Manlius Times, federal, by Leonard Kellogg; at Canandaigua, the Ontario Repository, federal, by James D. Bemis, and the Genesee Messenger, republican, by John A. Stevens; at Batavia, the Cornucopia, republican, by Peck & Blodget; at Geneva, the Geneva Gazette, federal, by James Bogart; at Cooperstown, the Otsego Herald, republican, by Elihu Phinney, and the Cooperstown Federalist, federal, by J. H. & H. Prentiss; at Owego, the American Farmer, neutral, by Stephen Mack; at Schoharie, the True American, federal, by Thomas M. Tilden, and the American Herald, republican, by Derrick Van Veghten; at Sherburne, the Republican Messenger, republican, by Pettit & Percival.* Papers published at Troy,

* Thomas' History of Printing.

which is nearly equidistant from the northern and southern boundaries of the state, were then organs of the north; and there were four newspapers printed in the region west of Onondaga, where now more are published than in 1810 supplied the whole state.

The number of newspapers now published within this state is upwards of three hundred, being an hundred times more than were printed in the state at the close of the revolution, and eight times the number printed in the United States at that period. The more important publications are, in the city of New-York, the Courier and Enquirer, by James Watson Webb; the Journal of Commerce, by Hale and Halleck; the New-York Express, by Brooks and Townsend; the Standard, by John I. Mumford; and the New-Era, by Jared W. Bell; morning papers: the Commercial Advertiser, by William L. Stone; the Evening Post, by William C. Bryant; and the American, by Charles King; evening papers, published upon the old system for regular subscribers: the New-York Tribune, by Horace Greely; the Sun, by Moses Y. Beach; and the Plebeian, by Levi D. Slamm, published upon the new plan of selling indiscriminately for cash: in the city of Albany, the Albany Daily Advertiser, formerly the Albany Gazette; the Albany Argus, by Edwin Croswell; and the Albany Evening Journal, by Thurlow Weed: in the city of Troy, the Troy Daily Whig and Troy Budget: in the city of Utica, the Oneida Observer and the Oneida Whig: in the city of Rochester, the Rochester Democrat and Rochester Daily Advertiser; and in the city of Buffalo, the Buffalo Commercial Advertiser and the Mercantile Courier.

There is scarcely more resemblance between the press as it now exists, and that institution as it was at the close of the revolution, than between the present aspect of our inland regions and the forest garb they wore while inhabited only by the Iroquois. *Then* the art, employed chiefly in printing the colonial statutes, almanacks, occasional sermons, and volumes of devotional psalmody, and publishing a semi-weekly record of events, was only auxiliary, in the hands of its managers, to the more important object of selling books, pamphlets, stationery.

and sometimes other merchandise: *Now*, labor-saving machines, with mechanical and brute power, are substituted for the arm of the pressman; and with the aid of stereotype foundries, the press has departments distinctly separated, and as numerous as the divisions and subdivisions, classes, combinations, interests, occupations, studies and tastes of society. The book press seizes with avidity all new publications, whether designed to instruct or only to amuse, whether foreign or domestic, and prints and reprints and scatters them over the continent with inconceivable rapidity. Works of fiction most adapted to the popular taste are now printed and sold at prices less than, fifty years ago, were charged to subscribers for the perusal of such volumes by circulating libraries. The commercial press, morning and evening, records with accuracy every occurrence and every indication which affects trade; and the advertising columns are indispensable auxiliaries in every operation of commerce or finance. The political press, divided between contending parties, and again subdivided with nice adaptation to the tempers and the tastes, the passions and the prejudices of the community, conducts party warfare with energy, zeal and unsparing severity; and the combatants, faithful throughout all changes, abide the trials and share the fortunes of their respective parties. The religious press furnishes to Jew and Christian, Protestant and Catholic, and to each of the sects and denominations of those grand divisions of the church, a devoted organ more effective than an army of missionaries. The moral, the scientific, the literary, the legal, the medical, the agricultural, the military, the abolition, the temperance, the colonization and the association newspapers each represent a portion of society desirous to inculcate peculiar views of truth, and promote reforms which it deems essential to the general welfare. The emigrants from every foreign country communicate with each other through organs furnished by the press, and preserve mutual sympathies and endearing recollections of their father-lands. The press *was* dependent on European facts, sentiments, opinions, tastes and customs: *now* it is in all things independent, and purely American. It *was* metropolitan: *now* it is universal. The newspaper in each important town conveys intelligence of all interesting

incidents which occur within its vicinity, to the central press, and receives in return and diffuses information gathered from all portions of the world.

The press studies carefully the conditions of all classes, and yields its reports with such a nice adaptation of prices as to leave no portion of the community without information concerning all that can engage their curiosity or concern their welfare. It no longer fears the odious *information*, or the frowns of power; but dictates with boldness to the government, and combines and not unfrequently forms the public opinion which controls every thing. Yet the press is not despotic. Its divisions distract its purposes, and prevent a concentration of its powers upon any one object. That the newspaper press is capricious and often licentious, will scarcely be denied; yet if it assails, it arms the party assaulted with equal weapons of defence, and yields redress for the injuries it inflicts. The ability, learning and spirit with which the press is now conducted, strikingly contrast with the dullness and superficial learning of its earlier period. Its editors, no longer regarded as mere chroniclers of events or pains-taking mechanics, hold rank as a liberal profession, and exert a just influence upon the multifarious interests of society. Nor are the sweeping allegations of indecorum, venality and violence brought against the press in any sense just. That it sometimes offends propriety, decency and candor, is unhappily too true, but it reflects in all things the character of the country; and while the ignorant, the prejudiced, the malevolent and the vulgar cannot be deprived of its weapons, it never withholds its resistless influence from truth, wisdom, justice and virtue. Every improvement of the public morals and every advance of the people in knowledge is marked by a corresponding elevation of the moral and intellectual standard of the press; and it is at once the chief agent of intellectual improvement, and the palladium of civil and religious liberty.*

There were in New-York in 1762, two Dutch Reformed Churches, and religious worship was celebrated therein in the language of the Netherlands. These

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* Notes on the History of the Press until the close of the Revolution, were received from Edwin Croswell, Esq.

and all other associations of that denomination acknowledged subordination to the classis of Amsterdam, which some times permitted, and other times refused powers of ordination. The expenses attending the journeys of candidates for ordination to Holland, and the reference of disputes concerning doctrine and discipline, to foreign judicatories, induced a portion of the clergy, even at that day, to seek a domestic organization. There were also two Protestant Episcopal churches which were more independent; but still the bishop was obliged to go to England for orders, before he could exercise his ecclesiastical functions; and rectors were required to be instituted and inducted, agreeably to the king's instructions to the governor, and the canonical rights of the bishop of London. The presbyterians had one church, and aimed at ecclesiastical independence, but all such efforts were defeated by the opposition of the episcopalians; and to save their little edifice and grounds, the former conveyed the glebe in 1730 to the moderator of the general assembly of the church of Scotland and others, as a committee of that body, and received from it a declaration that "the property was held on condition that it should be free and lawful for the presbyterians in the city of New-York and its vicinity to convene in the edifice for the worship of God in all the parts thereof, and for the dispensation of all the gospel ordinances." Besides these churches, there were a small French church, two German Lutheran societies, a Friends', a Moravian and Anabaptist meeting houses, and an obscure synagogue. But the dependence of the church had one advantage. Many of the clergy had received a transatlantic education, while this country was destitute of proper seminaries, and the reproach of ignorance did not attach to the theological profession.*

One of the most serious obstacles in the way of the revolutionary cause, was found in the apprehensions indulged by persons connected with the English established church, that religion, here deprived of the sustaining support of the mother country, must languish, and infidelity and vice disappoint the hopes of those who

* American Gazetteer, 1762.

had disseminated the principles of civil liberty. Experience has shown that this was a capital error, and that independence has been even more beneficial to the necessary diffusion of religious instruction throughout the continent, than to the political progress of society. We need only refer to the condition of the church in the city of New-York previous to the revolution, to show how incompetent a colonial religious establishment would have been to educate and send abroad the clergy and missionaries required among a growing people. The apprehensions to which we have referred were by no means general among the episcopalians, who soon became sensible of the injury which their church was receiving from that source, and from a prevalent prejudice that the episcopal form of government had a peculiar affinity for monarchical institutions. The best efforts of the clergy were put in requisition to refute these prejudices, and in many of the pamphlets, written for that purpose, may be found very able arguments against a union of the church and the state, and in defence of the cardinal principle that religion is best promoted, and most fruitful of blessings, when wholly independent of the patronage and control of government.

Soon after the revolution, all the religious denominations in the state, with one exception, had risen to ecclesiastical independence. Candidates for the clergy, for many years, obtained their theological education in the private study of some approved divine of their particular sect. But provision was early made to guard against the admission of unqualified candidates, by an open examination before the body which conferred orders. The advantages, however, which would be afforded by public institutions for theological education were too obvious to be overlooked. The "Theological Seminary of the Associate Reformed Synod of New-York," was established in 1801, through the efforts of the reverend John M. Mason, D.D., and was the first theological institution in the United States. Dr. Mason was elected the only professor of the school in 1804, and it went into actual operation in 1805. It received a valuable theological library, procured in Europe in 1802, by the personal solicitations of its founder. He relinquished his office after about fifteen years. The school was removed to Newburgh, and

received a charter in 1825. It has three professors and eleven students, and a collection of 4,000 volumes. The Lutherans, in 1815, established the Hartwick Theological Seminary, at Hartwick in Otsego county. It had two professors, some ten or twelve students, and a library of 1,000 volumes. The Theological Seminary of the Protestant Episcopal Church in the United States, was instituted in the city of New-York in 1817. It was removed to New-Haven in 1820, but restored to New-York in 1821, and was then incorporated. It has now five professors, seventy-four students, and about 7,260 volumes in its libraries. It has given to the church one hundred and eighty-six ministers. The Presbyterian Theological Seminary, at Auburn, was founded in 1821. It has four professors, sixty-nine students, and libraries containing 5,000 volumes, and has sent forth into the vineyard of Christ three hundred and forty-four laborers. The presbyterian "New-York Theological Seminary," in the city of New-York, was established in 1836, and has four professors, ninety students, and libraries containing 12,000 volumes. The Baptist Association have founded an academical institution at Hamilton; the Methodists a similar one at Lima; and the Catholics a like institution at Rose-Hill; with a laudable purpose respectively of elevating the standard of education among their clergy.

Although the various divisions of the church have generally observed forbearance towards each other, and a good degree of harmony has prevailed among their own communions, there has been enough of controversy to test the learning and skill of the clergy in polemic divinity. The first instance of this kind occurred in the Reformed Protestant Dutch Church, and is known in its annals as the "coetus and conferentic controversy." The inconveniences of dependence upon the classis of Amsterdam, before mentioned, induced certain ministers, in 1737, to propose the plan of a coetus or assembly of ministers and elders, which should have merely powers of advice and admonition. This plan which was adopted and approved by the church in Holland, called forth the exertions of the reverend Theodore J. Freelinghuysen. The arrangement proved inefficient, and, in 1754, the church was distracted by two parties, the one called the coetus

insisting on casting off ecclesiastical connection with the classis of Amsterdam; the other, the "conferentia," which struggled to maintain that connection. The weight of learning was on the side of the latter; but zeal, industry and more practical preaching distinguished the former. The controversy was finally settled in 1772, chiefly through the agency of the reverend Dr. John H. Livingston and the reverend Dr. Laidley of New-York, and the reverend Dr. Eilardus Westerlo of Albany, and the reverend Dr. Theodoric Romeyn of Schenectady.

In 1805, Dr. William Linn commenced, in the Albany Sentinel, a series of strictures upon a work then recently published by the reverend John H. Hobart, afterwards bishop of the Protestant Episcopal Church, entitled "A Companion for the Altar," in which the peculiar claims and tenets of the *Episcopal* ministry, in regard to divine ordination, were set forth. Mr. Hobart's doctrines were defended with great ability by Thomas Y. How, Esq., under the signature of "A Layman of the Episcopal Church," and by the reverend Frederick Beasly of Albany, under the name of "Cyprian." Dr. Linn rejoined, and thus drew into the controversy bishop Moore, who assumed the name of "Cornelius;" bishop White of Pennsylvania, under the name of "Detector," and Mr. Hobart, under the signature of "Vindex." Dr. Linn, under the signatures of "Umpire" and "Inquirer," defended himself with great ability against these new antagonists. These essays constitute a part of our theological learning. In 1806, the reverend John M. Mason, D.D., reviewed these essays in the Christian's Magazine. Whatever may be thought of the merit of the controversy, it is universally admitted that the review was written with extraordinary force and brilliancy, logical acumen and point. It excited great interest, and the whole controversy is worthy of a reperusal. Dr. Mason is remembered as a man of ardent temperament, great genius, high literary attainments and deeply versed in all the learning of his profession, and as a fearless commentator on the tendency of passing events. He employed the whole powers of his intellect in expounding the scriptures, and excelled in eloquence and persuasion all his contemporaries.* The reverend

* M. C. Patterson's Address on Primary Education.

Dr. Samuel Miller, in 1807, published letters on the constitution and order of the christian ministry, which engaged him in a controversy concerning that important doctrine with Thomas Y. How, the reverend Dr. Bowden of Columbia College, the reverend Dr. Kemp of Maryland, and Dr. Hobart, afterwards bishop. Dr. Miller's portion of this controversy is held in high estimation by that portion of the church whose views accord with his own. The "Triangle," by the reverend Mr. Samuel Whelpley, is still remembered as a masterly performance.

In pulpit eloquence, the reverend Dr. Mason's discourse upon the death of Hamilton, and baccalaureate addresses by the reverend Eliphalet Nott, D.D., president of Union College, are productions of a high order.*

A colonial writer, to whom we have before referred, describes the medical profession as worthy of very little respect, and declares "that pretenders have recommended themselves to a full practice and profitable subsistence. This," he adds, "is the less to be wondered at, as the profession is under no kind of regulation. Loud as the call is, they have no law to protect the lives of the king's subjects. Any man at his pleasure sets up for a physician, apothecary and chirurgeon. Candidates are neither examined nor licensed, nor are they even sworn to fair practice."

Nevertheless, we find occasional notices of medical prescribers who had enjoyed the advantages of sound education at foreign universities, and who dispensed the benefits of their knowledge in this, their adopted country. Megapolensis, Dupie, Dubois, Beekman, Magrath, John Bard, Middleton, Clossy, and Farquhar were justly conspicuous. Dr. Cadwallader Colden, who was surveyor-general, and subsequently lieutenant-governor of the province, was eminent not only as a philosopher and a naturalist, but as a physician and medical writer. We are indebted to him for the first scientific account which we have of the climate and diseases of the city of New-York. We have in this work satisfactory evidence, that owing to the "clearness" and purity of the atmosphere, and its vigor in the spring season, consumption of the lungs is not an endemical disease, and hence

* Notes concerning the clergy were received from the reverend Dr. J. N. Campbell and the reverend T. C. Reed.

it results that the prevalence of pulmonary affections has been produced by erroneous personal and social habits. Dr. Colden's elaborate paper on the management of the fever of New-York, which prevailed in 1742; his account of the plant called "water dock," and his earnest recommendation of the cooling process, in the cure of fevers, an innovation on the therapeutic measures of that age, are yet held in high estimation.*

Dr. John Bard, already mentioned, published an able essay on the nature and cause of malignant pleurisy, which proved very fatal on Long Island in 1749, and astonished his medical brethren in New-York in 1795, by identifying at once the pestilence, which then ravaged the city, with the malignant yellow fever, of which not a case had occurred within his observation, since its previous visit in 1742.

His son Samuel Bard, while a student at the university of Edinburgh, received the Hope medal as an acknowledgment of his acquirements in botany, and his inaugural dissertation, *de viribus opii*, attracted the attention of the erudite Haller. He made other contributions to medical science, of which his "Inquiry into the nature, cause and cure of the angina suffocativa," or sore throat, a disease attended with great mortality in New-York, will perhaps be longest remembered.

Dr. Jacob Ogden, of Long Island, in 1769 and 1774, addressed to the public, letters on the same disease, which are worthy of reference, because they urge with boldness the mercurial practice, which, although it had been before suggested by Dr. Douglass, had not yet obtained any general favor.

Dr. Richard Bayley, in 1781, published a letter to Dr. William Hunter of London, on "Angina Trachealis," or the croup, setting forth a new mode of cure of that very alarming and too often fatal inflammation, and subsequent experience in this and other countries has confirmed the utility of the discovery.

In 1769, a medical faculty was projected and associated with the academic corps of King's, now Columbia College. This measure awakened an active spirit

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* Dr. FRANCIS' Discourse before the New-York Lyceum of Natural History.

of inquiry into the sciences tributary to the healing art. Middleton, Bard, Smith, Tennant, Clossy and Jones, the first professors, were eminent in their respective departments. Middleton exhibited research and learning in a comprehensive discourse on the history of medicine. Clossy had written with success on morbid anatomy. The first instance in which the degree of doctor of medicine was conferred in this state was in 1771, when Samuel Kissam received that honor. A copy of his inaugural dissertation on the anthelmintic virtue of the *phaseolus zuratensis siliqua hirsuta,* is preserved in the library of the New-York Historical Society. The medical school connected with King's College was visited with the same misfortunes which befel that institution during the revolutionary war. Efforts made by the regents of the university, after the return of peace, to reörganize the medical faculty, were unsuccessful. In 1792, however, the trustees announced the reëstablishment of the school, and doctors Bailey, Post, Hammersly, Rodgers, Mitchill, Hosack and Stringham labored assiduously as professors during several years. The "College of Physicians and Surgeons" in the city of New-York was founded under a charter granted by the regents of the university in 1807. Nicholas Romayne, as president of this new school, delivered an inaugural discourse, evincing varied knowledge and very original views on the physiology of the different races of the human species. Smith, Hosack, De Witt, Miller, Bruce and others, professors in this institution, gave it a high reputation, and secured popular approbation of its instructions; but a rivalry between it and the medical school of Columbia College was justly regarded as a public misfortune, and in 1813 the two institutions were combined. In the new faculty, anatomy was assigned to Dr. Post, the practice of physic to Hosack, chemistry and pharmacy to Dr. Macneven, surgery to Dr. Mott, materia medica to Dr. Francis, obstetrics to Dr. Osborn, mineralogy to Dr. Mitchill, and medical jurisprudence to Stringham. The school flourished many years, but at length, in 1826, professional rivalry, and the deaths of some of the professors, so embarrassed the survivors that they resigned their chairs, and retired with the thanks of the regents for their eminent ability and assiduity.

The regents appointed a new faculty, consisting of doctors Watts, J. A. Smith, Stevens, Dana, J. M. Smith, Delafield and John B. Beck; and Dr. Watts became president of the institution, which, with some changes in its corps of teachers, still continues to dispense medical knowledge. The faculty which had retired, established a new school under the sanction of Rutgers College of New-Jersey, and gave lectures for a time in the city of New-York, which were received with high favor; but a charter being denied them, they discontinued their labors in 1829.

The University of the city of New-York has recently established a medical faculty, in which Dr. Mott lectures on surgery, Dr. Patterson on anatomy, Dr. Paine on the materia medica, Dr. Draper on chemistry, Dr. Revero on the practice of physic, and Dr. Bedford on obstetrics. About four hundred pupils are now annually educated in the medical profession in the city of New-York.

The College of Physicians and Surgeons of the western district was founded at Fairfield, in Herkimer county, in 1812, under a charter granted by the regents. The institution flourished many years, but has recently been discontinued, and its professors transferred to the new Medical College recently established at Albany. The faculty of this institution combines much talent and learning.

A faculty of medicine equally respectable and efficient has been established at Geneva College, and is diffusing medical knowledge very extensively to the numerous candidates for the honors of the profession in the western region of the state. The medical schools last mentioned have received liberal aid from the public treasury, and deservedly continue to enjoy the nurturing care of the regents of the university.

Returning from this brief account of institutions for medical education to our notice of the early progress of the healing art, we find a short paper written by Michaelis during the revolutionary war, showing the importance of opium as applicable to certain conditions of the human system, being an essay containing interesting results of his practice among the foreign troops. North, a physician attached to the British army in New-York, about the same time, introduced his

apparatus for facilitating the inhaling of medicated vapors, since so widely approved in Europe. Magrath, an Irish physician in the same city, deserved to be remembered for his strenuous efforts to introduce the cooling process of treatment of febrile diseases. Surgery found an intrepid operator in McKnight. Bailey, Bard and Treat were distinguished in clinical toil, and Crosby and Dingley are remembered as skilful practitioners.

Dr. Addams published in 1791 the first American tract on the subject of yellow fever. The subsequent recurrence of that pestilence in 1795, called forth essays by many medical writers; among whom were Buel, E. H. Smith, Mitchill, Seaman and Bayly. The latter aimed to establish a distinction between infectious and contagious diseases, until that time too generally confounded by physicians.

The dreadful ravages of the yellow fever in the United States, and reports too fearfully authentic of calamities inflicted by a like plague on the coast of Africa and in the West Indies, had created a spirit of philosophic inquiry into the origin of the disease, when Dr. Priestly arrived in this country. Recognised as the author of the gaseous philosophy, which was expected to throw new light upon the subject, his presence stimulated the eagerness of research into the nature of fevers and of pestilence in general. Dr. Mitchill put forth a treatise on the qualities of the nitrous oxide gas, and entered into a controversy with Priestly concerning the nature of phlogiston. The recurrence of the disease with undiminished virulence in 1798, 1801, 1803, 1805, 1819 and 1822, prolonged the discussion thus commenced. Notwithstanding all that has been written, the nature of the pestilence is a mystery yet to be unfolded; but it is just to affirm that the learning, talents and clinical acumen which the subject has called forth, reflect honor upon the professors of the healing art.

The writings of Dr. Miller, and his new nomenclature of febrile and pestilential diseases, have had a wide circulation. The numerous contributions to medical science by Dr. Hosack, have had much influence on the minds of professional and general readers; and he is distinguished for having projected a new classification of contagious diseases.

In 1816, a new topic of inquiry was presented here, as well as in Europe, involving the question whether the human system was susceptible of the yellow fever a second time. Dr. Francis, then in London, addressed a letter of inquiry on the subject to the medical faculty of the United States; and the result of the testimony acquired, seemed to show that, after one visitation, the constitution has generally an exemption from that disease. Dr. Townsend, in his treatise on the yellow fever as it manifested itself in 1822, corroborated this conclusion; but after all, on a point of such deep interest to humanity, further inquiry seems desirable.

Dr. Hugh Williamson's "Observations on the climate in different parts of America, compared with the climate in corresponding parts of the European continent," is a work of much interest. His exposition of the meliorating effects of cultivation of the earth upon the temperature of the country, is very cheering to the philanthropist. The disquisitions of Dr. Samuel Forry, on the climate of the United States, and its endemic influences, challenges the attention of the philosopher as well as of the physician.

A disease designated by several names, as "spotted fever," "malignant typhus," "typhoid pneumonia," and other appellations, prevailed extensively in 1812 and 1813. Monographs on this pestilence were given to the public by North, Hosack, Hudson, Arnell, and several other contributors to the New-York Medical Repository, and to other periodical journals.

The appearance of the cholera asphyxia, in 1832, at New-York and at Albany, and shortly afterwards its extensive ravages in other parts of this state, and the United States, awakened medical ardor, and the new enemy was encountered with energy and with clinical acumen. It numbered four thousand victims in New-York, and was proportionably not less fatal in Albany. Francis, Paine, McNaughton and Reese were distinguished by their examinations into the origin and nature of the disease. It is deeply to be regretted that we are still without a direct and perfect history of this, and the various other epidemics which have prevailed at different periods. The influenza spread over our territory in 1807, in 1811, and

in several subsequent years. The scarlet fever and the measles have, during the last twelve years, been unusually rife, and the varioloid, or modified small pox, has again and again intruded, and sometimes with great malignity. Have the two former diseases acquired more power with their increasing virulence? Has the frequent recurrence of the varioloid a tendency to impair confidence in the efficacy of vaccination? These are inquiries in which the happiness of mankind are deeply interested.

Previously to the revolution, and for some time afterwards, the art of surgery was neglected. The United States furnished no schools, and chirurgical knowledge was confined to those who had received a foreign education. A post mortem anatomical examination is recorded as early as 1691. The subject was the body of governor Sloughter, who had suddenly died under circumstances creating a suspicion of poison. The account of the dissection is sufficiently minute and satisfactory to do away the imputation, and the pathological conclusions of the surgeons concerning the cause of death corresponded with the received doctrines of that age. The earliest anatomical dissection, for the purpose of imparting knowledge, was performed in 1750, by doctors John Bard and Peter Middleton; the subject was a convicted felon.

John Jones, already mentioned as one of the faculty of King's College, first performed the operation of lithotomy in the city of New-York. He produced, in 1775, "Plain Remarks upon Wounds and Fractures," which was the first surgical treatise printed in America, and became a text book. Dr. Bayley, in 1782, successfully performed the operation of amputating the arm at the shoulder joint, which had not before been attempted in this country. Dr. McKnight, in 1790, accomplished a bold and difficult operation in obstetrics, until then unattempted here, except in a case thirty years previous, when it was performed by Dr. John Bard.

Surgery is now taught in all our medical schools, and facilities are afforded in them all, for the study of practical anatomy. Yet there is a deficiency of advantages for imparting that perfect clinical instruction that can only be given in an

infirmary, where the various surgical operations are performed for the relief of patients. The New-York Hospital is the only institution in the state possessing such advantages. This institution was founded in 1770, at the suggestion of Dr. Bard, but the war prevented its being open for the reception of patients until 1791. The students of the medical schools in New-York enjoy the advantages it affords. Among the surgeons who have acquired reputation since the revolution, we may name Dr. Wright Post, who has the merit of having, in 1817, first performed successfully the operation of tying the subclavian artery. In 1818, Dr. Mott tied the arteria innominata, in the person of a patient who had a subclavian aneurism, an operation never before attempted. The difficulty of performing this operation, without fatal consequences, results from its effects to stop almost the whole direct supply of blood from one side of the head, and from one arm. The patient died twenty-six days after the operation, in consequence of secondary hæmorrhage; but it satisfactorily appeared that the ligature had not prevented a necessary supply of blood, and thus one source of apprehension concerning this operation was removed. It has been repeated once by Graefe of Berlin. His patient died sixty-seven days after the operation. Dr. Mott, in 1827, applied a ligature to the common iliac artery, to cure an aneurism; an operation never before attempted for that purpose; and in 1828, he exscinded the clavicle in a case of osteosarcoma of that bone; an operation, until that time, unknown in surgery.

Pomeroy White, of Hudson, was the first surgeon in this country who tied the internal iliac artery. We cannot leave these notices of chirurgery, without mentioning the high merits in that department of Alexander H. Stevens, John C. Cheesman and J. R. Rodgers.

Physiology has only recently engaged attention in this state. A young Canadian received a musket shot in the side, which carried away a portion of the walls of the thorax, and perforated the stomach. He recovered from the effects of this injury under the care of Dr. Beaumont, a surgeon in the army, residing in this state; but a fistulous opening in the stomach remained, through which articles

of food might be introduced or withdrawn, and the aperture permitted visual observations of the organ. The case was rare, and almost unique in the annals of medical science, and certainly in no other instance had such an one been made so profitable to physiology. By a series of observations and experiments, continued for a long time, Beaumont arrived at these results: 1st. The existence of a gastric juice secreted by the stomach, and exciting a solvent action on food. 2d. That this gastric juice is found in the stomach only when it is excited by the presence of food or other irritants. 3d. The period required by the stomach for digesting different substances, the effects of various agents and the phenomena attending the different stages of digestion. These observations were made at intervals from 1825 to 1833, and were published in the latter year at Plattsburgh. The government of the United States made a marked acknowledgment of this eminent contribution to medical science.

Dr. Dyckman's dissertation on the pathology of fluids is held in high estimation. In the same class of publications may be noted "An Essay on Poisons," by Henry W. Ducachet; and "Experiments on the Blood," by Dr. Macneven. Investigations, to considerable extent, have been made by Dr. Francis, on the hydrostatic test of Hunter, to ascertain the viability of fetile and infantile life.

Independently of the connection of physiology with the medical art, the science has recently acquired interest as a part of general education in our colleges and academies, and forms the subject of a popular treatise written by Dr. Lee, of New-York, and introduced into the school district library. The diffusion of such knowledge throughout the country, reacts upon the profession, and encourages its members to more careful and accurate investigation of the physical constitution.

Dr. Stringham of Columbia College, and of the College of Physicians and Surgeons in the city of New-York, delivered very interesting lectures upon medical jurisprudence. The course of instruction upon the same science has been continued in that institution by John W. Francis and John B. Beck. Dr. Francis has published several essays on subjects falling within that department; and has

dwelt upon its relations to the science of obstetrics in his edition of the work of Dr. Denman. Dr. Blatchford of Troy, in 1817, published an essay on feigned diseases, which contains the results of much curious observation. T. Romeyn Beck and John B. Beck have given us, under the name of the former, a volume on the science of medical jurisprudence, which has contributed to modify, in many important features, our code of criminal law; and is admitted in Europe to be the best work on the subject written in our language, and to display more discriminating and patient research, free from ostentation of learning, than any work in the same department now extant.

The periodical medical journals merit at least a passing notice. The Medical Repository was begun by Drs. Smith, Mitchill and Miller, in 1797, and continued through twenty-three annual volumes. The American Medical and Philosophical Register appeared in 1810, and was conducted by Dr. Hosack and Dr. Francis. The New-York Medical and Philosophical Journal was published in 1809 and the two succeeding years, under the superintendence of Dr. Smith, Dr. De Witt and Dr. Macneven. The New-York Medical and Physical Journal was commenced in 1822, and continued several years, by Drs. Francis, Beck and Dyckman. The New-York Medical and Surgical Journal, extending to four volumes, was published anonymously in 1840 and '41. The New-York Medical Gazette is a contemporaneous work.*

So intimate has been the connection between political science and jurisprudence, and so much have the members of the legal profession been identified with the patriots and statesmen who have overthrown a system incompatible with the development of the state, and perfected a republican government in its place, that we shall not assign to the bar a distinct place in these notes, but shall occasionally advert to its condition and progress in a brief sketch of the political history of the state.

As we have seen, the germ of New-York was a shoot from a commercial aristocracy. The Dutch, who had no popular liberty nor representative legisla-

* Notes concerning Surgery and Physiology were furnished by Thomas Hun, M.D.

tion at home, bestowed no thought on colonial representation. The company by whom the colony was founded had an absolute power over its government.*

The form of government established was essentially feudal. Charters were given to patroons, conveying large grants of land to be occupied by a tenantry, over whom the proprietor exercised military and judicial authority, personally presiding in his courts of justice; but in important cases an appeal was reserved to the governor.† Such jurisprudence, as was then known in the colony, was derived from the Roman civil law.‡ The institution of human slavery was contemporaneous with the foundation of the colony, "the company pledging itself to furnish the colonial manors with negroes, if the traffic should prove lucrative." No legal provision was made for the diffusion of religion or knowledge. The jealous spirit of commercial monopoly in Holland forbade the colonies to make any woolen, linen or cotton fabric, on penalty of exile; and to impair the monopoly was punishable as a perjury.§ The first fruits of such a charter were seen in the venality of the directors and agents of the company, who soon appropriated to themselves, under pretence of founding settlements, all the important points where the natives came to traffic, and jars and dissensions between the feudal possessors and the government necessarily followed. Nor did the inhabitants of the province immediately gain political advantages from the conquest by the English. Nichols, by whom the reduction of the colony was effected, and who was the first English governor, during his short stay in New-York, enriched himself as did many of his successors, by making new grants of land and exacting compensation for confirming those previously made. The governor chose his own council, and exercised executive and legislative powers. A court of assize was constituted, but the justices were appointed by the governor and dependent on him, and served only to increase his importance while diminishing his responsibilities. He called a convention of two deputies from each town, but conceded to that body no legislative powers; and the assembly, after settling the civil divi-

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* Bancroft. † Barnard's Discourse. ‡ Kent. § Bancroft.

sions of the colony, concluded their labors with a loyal address to the proprietor and retired, without having transcended the limits assigned by his representative. Yet the inhabitants had suffered so long the inconveniences of arbitrary government, and indulged such high expectations of participating in the enjoyments of the rights of subjects, on becoming a part of the British empire, that a spirit of liberty was awakened among them, which was never afterwards to be repressed.

Governor Lovelace, the successor of Nichols, continued to exercise the same unlimited authority, and levied taxes and imposed duties, without consulting the inhabitants. The people assembled, in many places, and addressed to the court of assize, petitions, in which they reprobated their exclusion from legislation, and the principle of taxation without consulting the people, as inconsistent with the English constitution. Failing to obtain any important concessions, the inhabitants in several towns resolved to withhold payment of taxes. These resolutions were laid before the court of sessions of the West Riding, whose jurisdiction then extended over Staten Island, Newtown and Kings county. That court, assisted by the colonial secretary, and one of the council, adjudged the representations scandalous, illegal and seditious; and the papers having been laid by the governor before his council, were, in pursuance of their orders, burned by the common hangman.*

The new patent granted to the Duke of York, in 1674, made no concession of popular rights, but confirmed his power to enact all such ordinances as he or his assigns should think fit, reserving a right of appeal to the king and his council. No person could trade with the province, without the proprietor's permission, and he was authorized to establish such imposts as he should think necessary. The arbitrary proceedings of Andros, in 1675, called forth meetings, in which the people expressed a firm determination to persist in their claims for a representative legislature. Those claims were submitted, by the governor, to his patron. James replied, "I cannot but suspect assemblies would be of dangerous conse-

* Dunlap.

quence; nothing being more known, than the aptness of such bodies to assume to themselves many privileges which prove destructive to, or very often disturb the peace of the government, where they are allowed; neither do I see any use for them. Things that need redress may be sure to find it at the quarter sessions, or by appeals to myself." The discontent of the colonists was not allayed by this answer. The governor proceeded to England for instructions, and returned with the information that the proprietor had condescended to limit to a term of three years the existing arbitrary imposts; a concession, which only served to excite universal disgust. The influence of William Penn, however, prevailed upon the Duke of York, and he granted, in 1683, what was called a "charter of liberties." It declared that supreme legislative power should forever reside in the governor, a council, and the people; and gave to freeholders and freemen the privilege of voting for representatives. The assembly consisted of seventeen members, a number which was gradually increased to twenty-seven before the commencement of the revolution; and the charter declared that no tax should be assessed on any pretence whatever, without consent of the assembly. But the governor was appointed by the proprietor, and the council were appointed by the governor, and both the governor and proprietor retained the right to negative all bills, and to prorogue and dissolve the assembly. No sooner had the duke ascended the throne of England, than he sought to overturn the constitution which had thus been founded. He decreed a direct tax upon the colony, by ordinance, and instructed the governor to reörganize the council, and to make laws, levy taxes, and control the militia, with the consent of the council alone; and added to these instructions an injunction to suffer no printing press to be established in the colony.

The revolution of 1688 was hailed throughout the colony as the harbinger of liberty. The general assembly was again reörganized, and the government assumed forms somewhat conducive to the maintenance of law and order; but still denying to the people rights enjoyed by their fellow subjects in England, and maintaining a policy injurious to the growth and prosperity of the colony. The governor was directed by queen Anne to take especial care that the Al-

mighty should be devoutly and duly served according to the rites of the church of England, and to give all possible encouragement to trade and traders, "particularly to the Royal African Company in England;" which company was expressly desired by the queen, "to take especial care that the colony should have a constant and sufficient supply of merchantable negroes, at moderate rates." No commodities were allowed to be imported into the colonies, or exported thence, but in vessels built in England, or in some one of her colonies, and navigated by British crews. The colonies were prohibited from exporting to any other country than England, and imposts were established by the royal government.

In 1703, the assembly, justly complaining of the misapplication of the colonial revenue, insisted upon the establishment of a treasury. Governor Cornbury refused to comply with this demand, saying to the assembly that "they talked of their rights," but he knew of "no rights they had as an assembly but such as the queen was pleased to allow." But the governor was nevertheless dependent upon the assembly for supplies, and that body, unmoved equally by executive influence and prerogative, became continually more democratic.

The judiciary of the colony consisted of such inferior courts as those held by justices of the peace, courts of sessions, and courts of common pleas, and the supreme court, which was as it now is, a court of general, civil and criminal jurisdiction. In 1712, governor Hunter, by the advice of his council, and without the consent of the assembly, and for the purpose of increasing the royal power, erected a court of chancery, assumed to himself the powers of chancellor, and appointed the requisite number of masters, with an examiner, register and clerks.

The effect of this institution was to increase the power of the crown, and to diminish that of the assembly. That body thereupon protested against the establishment of the court, as an act of royal usurpation; but the lords of trade who then had superintendence over the affairs of the colony, affirmed her majesty's right to institute as many courts as she thought proper. The controversy on this subject formed one of the grounds of the division of parties until the revolution.

The ignorance aud venality of the governors, and the extortions practised in the court, tended greatly to increase the popular odium; but governor Burnet was exempt from these reproaches.

In 1724 a collision arose between the governor and the assembly, upon his refusing to administer oaths to a member named De Lancey, who had been returned as a member of the assembly, on the ground that he was not a subject of the crown. The assembly claimed the right to judge of the qualifications of its members. This right of the assembly was not afterwards questioned.

It is recorded, to the honor of governor Montgomerie, who entered upon his administration in 1728, that he declined to officiate as chancellor until he received positive directions from the ministry. About this period in the history of the colony, the legal profession begins to claim attention.

Our first lawyer was Adrian Vanderdonk. He was educated at the University at Leyden, and came to America in a bark belonging to the patroon of Rensselaerwyck, in 1642. He resided in the last mentioned manor several years, filling the office of *scout*, which combined to some extent the duties of judge and sheriff. He subsequently removed to New-York, then New-Amsterdam, where he acted as chamber counsel, the government denying to him permission to appear in the courts, because there was no other lawyer to confront him. He signalized himself in 1650, by a remonstrance to the States General, upon the abuses of power in the colony, and in 1653 by his description of the New-Netherlands. The bar of the colony in 1716, admitted to its honors William Smith, the father of the historian, and James Alexander, father of Lord Stirling, who afterwards rose to eminence.

Rip Van Dam, lieutenant-governor, performed the executive duties in the interval between the death of Montgomerie and the arrival of colonel Cosby, who was appointed the successor. Cosby had instructions to relinquish to Van Dam one half of the salary and perquisites of the office, which had accrued during his administration; and, upon Van Dam's refusal to refund, assumed to clothe the judges of the supreme court with the dignity of barons and the powers and juris-

diction of exchequer, similar to those of the court of exchequer in England, in order to facilitate a recovery by the governor of his claims against his predecessor. Smith and Alexander, of counsel for Van Dam, excepted to the exchequer jurisdiction of the court. Lewis Morris, then chief justice, supported the exceptions, but was overruled by judges De Lancey and Phillipse. This decision, overruling the plea of Van Dam, excited high indignation among the people. The governor, nevertheless, removed the chief justice, whom he could not overawe, and the subservient De Lancey was, without consulting the council, appointed chief justice; a promotion for which he manifested his gratitude, by directing all his efforts to procure the indictment and conviction of Zenger for the libel before mentioned, and the detection of the authors of other libels in the Weekly Journal. In 1735, Alexander and Smith, who appeared as counsel for Zenger, filed exceptions to the commission of the judges, De Lancey and Phillipse, on the ground that the tenure specified in the commission was during pleasure, and not during good behavior, and for other causes. The judges met the exceptions with the answer, "You have brought it to that point that either we must go from the bench, or you from the bar," and excluded the contumacious lawyers, as has been already mentioned. These proceedings, together with those on the subsequent trial of Zenger, gave new violence to the political dissensions already raging in the colony.

A bill was passed in the assembly for the frequent meeting and calling of the general assembly; but the council amended it in such a manner as to change its effect, and it failed to become a law. In 1735, Mr. Garretson, a member from Kings county, submitted a report to the effect, that the maintenance of a court of chancery within the colony, without consulting the general assembly, was contrary to law, unwarrantable, and of dangerous consequence to the liberties and the property of the people, and the house concurred in the report. Still governor Cosby, finding the assembly more practicable than he had a right to expect, from the temper of the times, a succeeding one would be, continued that body, for a period of six years, refusing to dissolve it, or issue new writs of election;

which term was prolonged three years by his successor. These grievances justly irritated the people, and are recorded in the declaration of independence among the wrongs suffered at the hands of the king of Great Britain.

The general assembly of 1737, truly represented the spirit which then pervaded the people; and its proceedings are regarded as constituting an important era in the history of American legislation. In their address to the governor, they affirmed that none ought to represent the people but such as were freely and fairly chosen by them; that elections ought to be frequent; that experience had shown the danger of trusting the same men too long with power; and that proper checks and balances were necessary for the preservation of the liberty and happiness of any country. The assembly distinctly informed the representative of the crown, that they would not raise sums unfit to be raised, nor put what they should raise into the power of the governor to misapply, if they could prevent it; that they would not at any one time make provision for the support of government for a period longer than a year, nor would they even for that period, until such laws should be passed as were necessary to the safety of the inhabitants of the colony. They asserted the importance of having an agent at the court of Great Britain, appointed and paid by the house, independently of the governor. They firmly remonstrated against the continuance of the court of chancery, as then constituted, declaring that the governors in maintaining that court, without the consent of the assembly, had treated that body with unreasonable neglect and contempt, and affirmed that some of the governors were wholly unfit for the duties of chancellor or of any other station, though buoyed up and bloated with flatteries by the instruments of their misrule and oppression. The house now first adopted the important principle of recording the votes of members. They passed a bill to appoint an agent to the court of Great Britain, which was lost by non-concurrence, as to its principal features, by the council; demanded from that body satisfaction, for the insult it had offered by transmitting messages by the clerk, instead of a committee, limited supplies granted to the period of one year, and inhibited the treasurer from paying any part of the funds collected, until

proper laws should be passed for that purpose. They passed a bill for the frequent election of representatives, and the governor being intimidated gave it his assent, but it was afterwards disallowed by the crown. After coming into direct collision with the governor, the assembly was ordered to attend him, when he, in an angry strain of invective and abuse, pronounced their proceedings presumptuous, daring and unprecedented, and saying that he could not look upon them without astonishment, nor with honor suffer them to sit any longer, he declared the house dissolved.

One of our best historians* pronounces a high eulogium upon this legislative body, declaring that its members properly appreciated their own dignity, and that neither ministerial smiles nor frowns could sway them from the path of duty. Yet the record contains one spot which the friends of rational liberty would wish to see effaced. On a question concerning a contested seat, the assembly resolved that Jews could neither vote for representatives nor be admitted as witnesses.

The election showed that the assembly had not misunderstood the feelings or sentiments of their constituents; and the new legislature firmly adhered to the principles which had been asserted. The maintenance of those principles rendered the executive dependent upon the legislature, and thus an important step was taken towards that independence which was afterwards established.

The institution of domestic slavery now began to produce its fruits of suspicion and fear. By the laws regulating that institution, every colored person was a slave, and a slave could not be a witness against a free man. The persons thus held in servitude were punishable by their masters to any extent short of privation of life or limb. The disabilities of the slave were hereditary, and the race was therefore plunged into hopeless bondage and degradation. This oppression was supposed to be justified by the assumption that those thus injured were of "the accursed seed of Cain." Several fires having occurred in 1741, the negroes

* John Van Ness Yates.

were suspected as incendiaries. The magistrates, the police, and the common council, were seized with a panic which extended itself to the judges of the supreme court and throughout the city. All the members of the bar, consisting of Bradley, the attorney-general, and Alexander, Smith, Chambers, Nichols, Lodge and Jamieson, were summond to attend and aid the court. The lawyers, sharing the panic, volunteered to assist the public prosecutor by turns, and left the accused defenceless. Convictions were easily procured upon confessions, and the testimony of perjured informers extorted by threats and promises. The court forgot not only its own dignity, but the claims of justice and humanity. Four white persons, implicated in the supposed crimes, were executed. Eleven negroes were burned at the stake, eighteen were hanged, and fifty were transported and sold into foreign slavery.

The legislature in 1741 manifested a disposition to inquire into the defects of the jurisprudence of the colony, and Daniel Horsmanden, who was then a judge of the supreme court, was authorized to collect and revise the laws in force, with notes and references; but that duty was not performed. It is asserted that the inconveniences resulting from his continuance in office, in advanced age and under growing infirmities, was the cause of the adoption of a principle still continued in our constitution, which disqualifies a judge on his attaining the age of sixty years — a fact exceedingly interesting, as an illustration of the permanent influence which occasional circumstances may exert upon the legislation of a country.

In 1743, a law was passed for the relief of imprisoned debtors, and legacies were made recoverable in courts of common law. The practice of instituting prosecutions by *information*, which had been constantly regarded with jealousy since the trial of Zenger, gave rise to a bill for regulating such proceedings, but it was lost in the council through the influence of the lieutenant-governor. The ministry, distrusting the loyalty of a people so bold in the assertion of their rights, availed themselves of the alarm excited by the renewal of hostilities by France, with a view to place the pretender upon the throne, and required that a law

should be passed, obliging the inhabitants of the province to take the oaths prescribed by parliament, for the security of the government and of the protestant religion. The assembly complied, after a spirited debate, in which the measure was resisted, because it seemed to impeach the loyalty of the province. The collisions between the ministry and the governor on one side, and the assembly on the other, continued without abatement. The governor, in 1749, renewed his demand for provision for the support of government for five years, and when the house refused, threatened the members with punishment, declaring that the crown could abridge their rights and privileges at pleasure. The assembly resolved that the governor's conduct was arbitrary, illegal and a violation of their privileges.

In the instructions to governor Osborne, in 1753, the ministry persisted in all the obnoxious demands which had been so long and uncompromisingly opposed by the assembly. The year 1754 was rendered memorable by the assemblage of the congress of deputies of the several American colonies, at Albany, to devise a plan of union for common defence against the French and Indians. A project for a confederacy of the American colonies was prepared by Franklin. It embraced Massachusetts, New-Hampshire, Connecticut, Rhode-Island, New-York, New-Jersey, Pennsylvania, Maryland, Virginia, North-Carolina and South-Carolina; and proposed that each colony should retain its constitution, but a general government should be established, with a president-general and council, to be appointed by the crown, and a grand council to be composed of representatives elected by the assemblies of the several states. The apportionment of members in that council is worthy of notice, because it shows the relative population and strength of the colonies at that period, varying essentially from the relative importance of the several states at the present time. Massachusetts was allowed seven representatives, New-Hampshire two, Connecticut five, Rhode-Island two, New-York four, New-Jersey three, Pennsylvania six, Maryland four, Virginia seven, North-Carolina four, South-Carolina four. The powerful machine thus projected for the support of the British throne, was twenty-one years afterwards successfully

put in motion to resist the encroachments of parliament; and it is not impossible that the adaptation of the plan to such a purpose, induced its rejection by the ministry, while the fear that it would strengthen the royal power caused it to be disapproved with equal promptness by the colonial assemblies.*

The passage of the stamp act in 1765, which levied imposts in violation of a principle which all the American colonies had asserted, and thus far perseveringly maintained; and which provided for the execution of that impolitic measure by means and agents equally obnoxious, produced universal exasperation.

The act was printed and circulated in the streets of New-York, with the title of "The Folly of England and the Ruin of America." A congress of deputies met in New-York in October, 1765. New-York was represented by Robert R. Livingston, John Cruger, Philip Livingston, William Bayard, and Leonard Lispenard. Cadwallader Colden, then lieutenant-governor, announced that the congress was unconstitutional, unprecedented and unlawful, and he should give it no countenance. The congress solemnly protested that the people of the colonies were entitled to all the rights of Englishmen; that no taxes could be imposed upon them without their consent; that their only legislative representatives were the provincial assemblies; and that the stamp act, passed by the parliament of Great Britain, without the consent of those assemblies, was subversive of the rights and liberties of the people. The manifestations of popular indignation and resistance, obliged the lieutenant-governor, Colden, to surrender the stamps which had been sent over for the use of the province — a concession which he made under protest, and to avert the calamities of a civil war. The law was successfully resisted, and in the subsequent year was repealed; but the moment of the final controversy was now hastening, and every effort of the ministry to maintain the power of the crown, served only to inflame a spirit of resistance which had become general throughout the colonies.

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* Dunlap.

The press was brought into political action, and prepared the public mind for a conflict of arms. The royal cause was sustained by Dr. Miles Cooper, the president of the college, and other clergymen of the Episcopal church. William Livingston, afterwards governor of New-Jersey, Gouverneur Morris, and others, defended the rights of the colonies. John Jay, having received an accomplished education, and already acquired high rank at the bar, engaged on the same side; and at the same time, John Morin Scott and Alexander Hamilton, who then was only seventeen years of age, entered the controversy. On the 25th of July, 1774, Philip Livingston, John Alsop, Isaac Low, James Duane and John Jay, were appointed delegates to the first congress at Philadelphia. That body, in adopting a declaration of the rights of the people of the colonies, laid the foundations of independence and union. The committee who reported that paper, were Richard Henry Lee of Virginia, and Messrs. Jay and Livingston of New-York. An address was also made to the people of Great Britain. This state paper, which was prepared by Mr. Jay, was distinguished alike for its elevated tone and glowing language.

The general assembly of New-York was convened in 1775. Being in the interest of the crown, that body refused a vote of thanks to the representatives of the colony in the general congress, and by this, and other manifestations of pusillanimity, so effectually forfeited all claims to the public confidence, that the New-York committee of safety recommended that a provincial congress should be elected by the people. Mr. Jay, being a member of this committee, and now a third time elected a delegate to the general congress, surrendered himself to the public service. He distinguished himself, and aided the popular cause, by preparing an address to the people of Canada, invoking their neutrality; and afterwards by a similar address, which was made by congress to their fellow subjects in Jamaica and Ireland. These papers were among the most effective of those issued by congress; and which at once inspired the people of the colonies with confidence and zeal in their cause, and secured the respect of a large portion of the people of the mother country.

The inhabitants of Queens county, on Long Island, had refused to appoint delegates to the provincial congress, and the subject arrested the attention of the general congress. Mr. Jay, from a committee, submitted a report, with a bold and denunciatory preamble, "Whereas, a majority of the inhabitants of Queens county, in the colony of New-York, being incapable of resolving to live and die freemen, and being more disposed to quit their liberties than to part with a little proportion of their property, necessary to defend them, have deserted the American cause by refusing to send deputies as usual to the convention of that colony, and evinced by a public declaration an unmanly design of remaining inactive spectators of the present contest, vainly flattering themselves, perhaps, that should Providence declare for our enemies, they may purchase their favor and mercy at an easy rate; and, on the other hand, if the war should terminate in favor of America, that then they may enjoy, without expense of blood or treasure, all the blessings resulting from that liberty, which they in the day of trial had abandoned, and in the defence of which many of their more virtuous neighbors and countrymen had nobly died; and it being reasonable that those who refuse to defend their country should be excluded from its protection, and be prevented from doing it an injury," &c. The committee, therefore, recommended measures for putting the inhabitants of Queens county, who had voted against sending deputies to the provincial congress, out of the protection of the united colonies, and to disarm and subject the disaffected. The paper is a happy illustration of the spirit of the times, and of the talents of its author. At the close of the year 1775, when all of the southern portion of New-York was in the hands of the enemy, the American army had retired from Westchester, baffled in its attempt in Canada, and general Washington was retreating through New-Jersey, the proclamation of the British commander offering protection and rewards to the timid and irresolute, the pen of Mr. Jay was again called into requisition by the congress of the United States, and was effectually exercised in a glowing address to their constituents; a document of such extraordinary power, that, if it stood alone, it would be an ample vindication of the firmness and patriotism of congress.

To such labors Mr. Jay added the preparation of the first constitution of the state of New-York, which was adopted by the convention in 1777. This work, although it was forty-four years afterwards superseded by another, correcting some defects disclosed in its operation, nevertheless asserted the chief popular rights, defined the relative powers of the various departments, and established the great principles of fundamental law as they yet exist, and will continue for all time to come.

It is time, however, to notice other actors who had come upon the stage. Philip Schuyler had secured to himself a thorough knowledge of the French language, then a rare accomplishment in this country, together with varied learning and extensive knowledge of the exact sciences. His favorite studies were finance, military engineering and political economy. He had been distinguished in the provincial military service, and first drew to himself the attention of his fellow-citizens, by his efforts in the general assembly in 1775, in the debates which brought the struggle between the ministerial and whig parties to a crisis. George Clinton, afterwards governor, and Nathaniel Woodhull, afterwards president of the provincial congress, were associated with Schuyler in these debates, which involved not only the immediate causes of irritation, but also the fundamental principles of the British constitution, and of free representative government. To the spirit manifested on that occasion by the indomitable minority, may be attributed in a great measure the acquiescence of the people in the bold recommendation for discarding the general assembly and instituting a new provincial legislature. Thus was the boundary passed, a constitution subverted, and the colony, with her sister provinces, arrayed in open defiance of the British government.

On the 9th of July, 1776, the provincial congress ratified the declaration of independence, and immediately assumed the title of the convention of the state of New-York. A committee was appointed to prepare a constitution, and that task was entrusted to John Jay, James Duane, Gouverneur Morris, and Robert R. Livingston. The draft of the constitution was in the handwriting of Mr. Jay and was submitted by Mr. Duane; and those individuals, together with Gouver-

neur Morris and Robert R. Livingston, who also were eminent lawyers, gave to that instrument the form in which it was adopted by the convention. Upon promulgating the constitution, the convention appointed a council of safety, which was invested with all the powers requisite for the security and preservation of the state, until a governor and legislature should be duly chosen and qualified to act under the new constitution. This council, thus invested with absolute power, nobly justified the confidence reposed in them by the convention, by the wisdom, firmness, energy and moderation which they displayed in that trying emergency. Their names were John Morin Scott, Robert R. Livingston, Christopher Tappen, Abraham Yates, junior, Gouverneur Morris, Zephaniah Platt, John Jay, Charles De Witt, Robert Harpur, Jacob Cuyler, Thomas Tredwell, Pierre Van Cortlandt, Matthew Cantine, John Sloss Hobart and Jonathan B. Tompkins.

George Clinton was elected governor, John Jay appointed chief justice, and Robert R. Livingston chancellor, under the new constitution. Philip Schuyler was appointed, in 1775, a representative in the congress of the United States, and soon afterwards major-general in the continental army. Mr. Jay subsequently filled the trusts of chief justice of the United States, governor of New-York and minister to the court of St. James. The name of Schuyler, although eclipsed during the revolutionary contest by personal and partizan jealousies, is nevertheless destined to maintain a place in the military annals of that period, second only to his, who is without a compeer in the homage of mankind. Woodhull fell a martyr in battle, sustaining the cause he had so ably maintained in the councils of the state. The genius of Gouverneur Morris, as well as that of Robert R. Livingston, will be found impressed upon many a page, in which we are hereafter to record the social, moral and physical improvement of the State.

If to Massachusetts belongs the honor of cradling the revolution, and to Virginia that of having given birth to the author of the declaration of independence, and to the immortal chief who conducted the armies until its establishment, New-York may, with equal justice, lay claim to the honor of having produced the statesman who chiefly secured the adoption of the federal constitution, and put

it into effectual and successful operation. Alexander Hamilton, while yet a student in Columbia College, defended the republican cause in a series of essays, marked with so much ability and wisdom, that they were attributed to the pen of John Jay, who was then in the fore ground in the councils of the state and the union. Of the talents exhibited by Hamilton, as a confidential aid-de-camp of the commander-in-chief, we have not room to speak. In 1782, the ardent yet discreet Hamilton, became a member of the bar, and was elected a delegate to congress, and acquired a commanding influence in that body. In 1786, he was a member of the legislature of this state, and in the same year was a delegate to the convention which formed the constitution of the United States. Disappointed in procuring the adoption of what he deemed essential features of such an instrument, he nevertheless acquiesced in the decisions of the convention, and gave his free and unreserved assent to the constitution as it was promulgated by that august body. It was a mighty task to prepare a form of government which should guaranty the union, the liberties, and the happiness of a rising people; but a greater task remained. That people consisted of thirteen states, each of which had a separate constitution, local interests, and peculiar institutions, and was jealous of every thing which might, in the remotest degree, tend to diminish power and influence, deemed essential to popular liberty and self preservation. Whatever rendered the constitution acceptable to one or several states, awakened the jealousies of others, while, throughout the whole union, the people divided into two angry and violent parties; the one apprehending that the federal power would be too weak to preserve the national security — the other, that that power would be too oppressive, and result in despotism, even more unendurable than that which had been so recently overthrown. To reconcile these conflicting opinions and interests, and procure the assent of the states to the constitution which had been proposed, and when adopted to carry it into successful operation, under circumstances the most disheartening, was the task assumed by Hamilton. He addressed to the people a series of letters under the signature of the Federalist, in which he received important aid and coöperation from James

Madison and John Jay. In this admirable work he expounded the principles of the constitution, and pointed out its application in all the various exigencies of peace and war, and of domestic prosperity and discontent; and such were the sagacity and forecast thus manifested, that the Federalist still remains, after a lapse of half a century, a great and authoritative commentary on the federal compact. These labors were followed by others equally effective in the convention of this state, which resulted in the acceptance of the constitution of the United States by that body: efforts in which he was ably seconded by Robert R. Livingston, while that measure was resisted with great ability by Melancton Smith and his associates.

The people of the United States were not unaware of the difficulties which would attend the organization of the new government, and, therefore, with the greatest unanimity, called Washington from his retirement to preside in the public councils in that emergency. While wisdom and energy were required in every department, that, which was to be entrusted with the subjects of finance, was surrounded with the worst embarrassments. The federal government and the state governments were alike hopelessly encumbered with debts, and the credit of both was prostrate. There was, as yet, no plan of revenue, no currency. The country was filled with imported fabrics, while every department of domestic industry was deranged. In what manner could a sufficient revenue be provided for the necessary expenditures of the government in so trying an emergency, and how was the exhausted credit of the country to be restored, and its prosperity to be renewed and invigorated? These were among the leading questions, to be settled by the first congress that assembled after the adoption of the constitution; and they involved controversies in political economy, rendered still more difficult by conflicting interests and discordant views concerning the fiscal principles and powers of the government. Washington, with that sagacity which never erred, had assigned these subjects to the consideration of Alexander Hamilton, the first secretary of the treasury.

The work of Adam Smith, on the Wealth of Nations, published the year

before the revolution, though very deficient in methodical arrangement, and on many points extremely discursive, was, nevertheless, justly considered as constituting the foundation of a system of political economy, and establishing landmarks for the guidance of subsequent investigation.

Hamilton discussed, with surpassing ability, the fiscal policy of the government in four reports. The first of which was on the public credit; the second, on a national bank; the third, upon manufactures; and the fourth, on the establishment of a mint. To point out the proper means for paying the public debts of the union and of the states was the object of the first report. He recommended that no discrimination should be made between the creditors of the United States and those of the several members of the confederacy, and that the new system of finance should include the payment of all by the general government.

The report on a national bank commenced with the proposition that such an institution would be of primary importance, for a prosperous administration of the finances, and of eminent utility, connected with the operations for the support of public credit, and maintained the expediency of establishing such an institution, in a train of powerful arguments, derived from a view of the benefits which, it was alleged, resulted to trade and industry from public banks, as well as those affecting credit, which, as was supposed, such an institution would afford in the peculiar circumstances of the country. The whole subject of banking, the uses and relation of specie and circulating notes, their respective advantages and inconveniences as a currency, the arguments in favor of banks, and the objections to which they were obnoxious, were all thoroughly discussed. The president had required written opinions from the members of the cabinet, concerning the constitutionality of a bank. Mr. Jefferson, secretary of state, and Mr. Randolph, attorney-general, in their opinions denied the power of congress to establish such an institution. Hamilton's report may be considered a reply to these opinions, and whatever may be the merits of that still vexed question, this paper is universally conceded to be an able vindication of the side of the argument which the author adopted.

In the report on manufactures, Hamilton reviewed at length the positions assumed by Adam Smith, "that individuals were better judges, than statesmen or lawgivers could be, of the species of industry which their capital could employ to the greatest advantage; that as every individual was constantly exerting himself to find out the most advantageous use for his capital, the study of his own advantage would necessarily lead him to prefer that employment which must be most beneficial to the general society. That every individual, who had embarked his capital in the support of domestic industry, naturally aimed so to direct it that it might yield the greatest possible profit; that what was prudent and economical in a private family could scarcely be otherwise in that of a great country; that if a foreign country could furnish us with a commodity at a cheaper rate than we could manufacture it, it would be for our interest to purchase it with some part of the produce of our own industry, employed in a more profitable manner than in making the commodities referred to; and that to give the monopoly of home market to the produce of domestic industry in any art or manufacture, would be giving an artificial direction to private capital that must be either useless or injurious." From which, and similar positions of a like nature, Smith had drawn the conclusion that the application of private capital and labor ought to be as little as possible controlled or restrained by regulations of government. Hamilton discussed these doctrines with great ability. He admitted that if the reason, by which the principle of free trade was defended, had more generally governed the conduct of nations, they might have advanced with greater rapidity to prosperity and greatness than they had done by the pursuits of maxims too widely different. But he insisted that most theories had very many exceptions, and that very cogent reasons might be urged against the hypothesis that manufactures would grow up without the aid of government, "as soon and as fast as the natural state of things and the interest of the community may require." He showed, as objections to its truth, the influence of habit, the fear of failure in untried enterprise, the difficulties inseparable from competition with those who have attained perfection in the business to be undertaken, and the bounties, premiums and arti-

ficial encouragements with which foreign governments supported their own subjects, in divisions of industry in which they might be rivalled or surpassed. He also examined the hypothesis of the superior productiveness of agriculture, and maintained with elaborate reasoning that the general arguments brought to establish it were not satisfactory. He discussed the relative advantages of foreign and domestic markets, and the circumstances peculiar to the condition of the country, which, in his judgment, rendered the interposition of the government for the protection of national industry expedient and necessary. On all these questions the report covered the whole ground of controversy, and so full and forcible was its argument, that it is now referred to as authority, and as a text book by those who maintain the necessity of protecting American industry.

General Hamilton's report on the establishment of a mint discussed, 1st, What ought to be the money unit of the United States; 2d, The proper proportion between gold and silver; 3d, The composition and proportion of alloy in each metal; 4th, How the expense of coinage should be defrayed; 5th, The number, denomination, sizes, and devices of the coins; and 6th, Whether foreign coins should be permitted to be current, and at what weight.

These reports of general Hamilton determined the fiscal policy of the United States. The federal government funded its own debt and those of the states. A bank was established, and throughout its career, rendered to the government and to the commerce of the country the services contemplated. A tariff for revenue, incorporated upon the principle of protecting domestic industry was established, and a mint was founded which furnished a sufficient supply of the precious metals for the proper coinage of the government. The credit of the union and of the states was speedily renewed and invigorated, and the public debt incurred in the revolutionary war, largely increased in the war of 1812, was finally paid off and discharged during the presidency of general Jackson; and the universal prosperity consequent upon the measures thus adopted, is now a subject of history.

The legislature of New-York, as soon as the revolutionary conflict had ended, devoted itself to the duty of modifying the jurisprudence and civil polity of the

state, in harmony with the principles of the constitution and the beneficent spirit of the age. Peter Van Schaack, an eminent lawyer, had been directed, in 1774, to revise the statute laws of the province, a task which he performed with ability and accuracy.

It would be impossible, on this occasion, to review in detail the changes of municipal law which have been made; changes so great as to have created a code as peculiarly distinct and national as the civil law or the common law of England. The entire criminal code has been revised and ameliorated, by the substitution of a humane penitentiary system, with moral discipline and religious instruction established in lieu of a system which denounced the penalty of death for almost every form of municipal offence; and the new system has been recently improved by establishing a separate institution for the reformation of female offenders, under the exclusive care of persons of their own sex. The relations of debtor and creditor have been modified, and while frauds and dishonesty have been subjected to rightful punishment, the honest but unfortunate debtor is relieved from oppression. The relations of landlord and tenant have been divested of every remnant of feudal service, and conformed to the equal spirit of republican institutions. The laws concerning insane persons, copied from an English statute passed in the reign of queen Anne, by which those unhappy persons who were bereft of reason were classed with "vagrants and disorderly persons," and required to be imprisoned to protect society against their violence, have been modified; and an institution has been erected in which they are cured of their mental and physical maladies, with all the aids which modern science has devised in that interesting department of the healing art.

Preferences of primogeniture and of sex in regard to descents have been abolished, and judicious precautions have been adopted to prevent the too great accumulation and too long duration of estates. The rights of married women have been enlarged. The alienation of land has been relieved from embarrassments and obstructions; and the general registration of deeds and incumbrances has resulted in promoting the convenience of acquiring and the disposing of real estate.

Joint tenancies have been changed into tenancies in common. Lands mortgaged for the payment of debts have been placed at the disposal of the mortgagee and executor. Obstructions in the way of executions upon property, have been removed. Technicalities in conveyances have been dispensed with. The intricate statutes in regard to uses and trusts, have been simplified. The system of pleadings and practice in courts of law and equity, has been rendered less tedious and expensive.

Samuel Jones was distinguished as the prominent leader in these improvements in jurisprudence, and especially as the author of the statute for the amendment of the law and the better advancement of justice, and the laws relating to real estate. But there is one feature in this progress of improvement too prominent to be passed without more special notice. The first public evidence that justice was awakened in regard to the bondage of the African race, was manifested in a law passed during the revolution, by which slaves were invited to enlist in the provincial forces, with the consent of their masters, under a promise of emancipation after the term of their military service. When the constitution of the United States was formed, enlightened men throughout the union could not close their eyes against the evils which must obviously flow from guaranteeing, in that instrument, the perpetual maintenance of slavery; and while a portion of the states refused to enter the compact, except upon receiving concessions which they deemed sufficient to secure themselves against an early abolition of slavery by the power of the general government, this state, and others, refused to assent to a phraseology which could be construed to forbid emancipation; and all agreed to confer upon congress the right to inhibit the importation of slaves after the year 1808. The right of suffrage, under the first constitution of this state, was granted to free citizens, without distinction on the ground of color or descent. Mr. Jay was absent when the constitution prepared by him was adopted by the convention. In a letter addressed to two members of that body soon afterwards, Mr. Jay, after objecting to some features of the constitution, said, "the other parts I approve, and only regret that like a harvest cut before it was all ripe, some of

the grains have shrunk. I should have been for a clause against the continuance of domestic slavery." In 1788, the legislature passed an act which struck at the foreign slave trade, but not at the existence of the institution of slavery itself. This act declared "that if any person should sell, within this state, any negro or other person, who had been imported or brought into the state after the first of June, 1785, such seller should be deemed guilty of a public offence, and the person so imported or sold should be reprieved." Having been elected to the office of governor in 1795, John Jay diligently prosecuted his philanthropic purpose of procuring the abolition of slavery. Unwilling to expose that measure to the spirit of party, he did not recommend it in his first speech, but it was introduced by one of his friends into the house of assembly. After a protracted discussion, the bill was defeated, and a resolution was passed "that it would be unjust to deprive any citizen of his property without a reasonable pecuniary compensation to be rendered at the expense of the state." The effort was renewed in 1797, but was successfully resisted, and no vote was taken on the merits of the question. John Jay had long since declared, "that were he a member of the legislature, he would introduce a bill for the gradual abolition of slavery, and would never desist from urging its passage until it became a law, or he ceased to be a member." True to the principle thus avowed, he, in 1798, caused a bill to be introduced for the fourth, and, happily, for the last time. It was passed by majorities of ten in the senate and twenty-six in the assembly, and may be justly regarded as the crowning event of John Jay's administration. Slavery, however, still lingered, under some reservations contained in the law, until in March, 1817, during the administration of Daniel D. Tompkins, the annihilation of this form of bondage was effectually secured by an act emancipating "every" negro, mulatto or mustee within the state, born before the fourth of July, 1799. The new constitution of the state adopted in 1821 took a retrogade step in requiring of colored persons a property qualification of two hundred and fifty dollars as a condition of suffrage, while white citizens were allowed to vote without any such possessions. In 1840, with a view to the better protection of per-

sons unlawfully claimed by virtue of the constitution of the United States as fugitives from service in other states, the legislature extended to those claimed as such fugitives the privilege of a jury to try the question of servitude. In 1841, a law, which until then had been in force, permitting persons from other states, traveling within this state, to exercise rights as masters over slaves attending them, for a period not exceeding nine months, was repealed; and about the same time the executive authority decided that the state could not surrender, as a fugitive from justice, a person charged with stealing a slave as property; because this state could not admit that by the force of any human constitution or laws, one human being could become the property of another.

Robert R. Livingston filled the office of chancellor from 1777 to 1801; John Lansing junior, from 1801 to 1814; James Kent, from the latter year to 1823; Nathan Sanford, from that period to 1826, when Samuel Jones was appointed, who, in 1828, gave place to Reuben H. Walworth, the present chancellor.

The office of chief justice was, in 1777, assigned to John Jay, who was succeeded in 1779 by Richard Morris, who performed its duties until 1790, when Robert Yates was appointed. His successor was John Lansing junior, who held the office from 1798 to 1801, when the office devolved upon Morgan Lewis, who was, in 1804, succeeded by James Kent, who being appointed chancellor in 1814, resigned the office of chief justice, and was succeeded by Smith Thompson, afterwards secretary of the navy, and now one of the judges of the supreme court of the United States. Ambrose Spencer was appointed chief justice in 1819, and in 1823 was succeeded by John Savage, who resigned in 1837, and Samuel Nelson, the present chief justice, was thereupon appointed. The following persons have filled the offices of justices of the supreme court, and were appointed in the order in which they are named: Robert Yates, John Sloss Hobart, John Lansing junior, Morgan Lewis, Egbert Benson, James Kent, John Cozine, Jacob Radcliff, Brockholst Livingston, Smith Thompson, Ambrose Spencer, Daniel D. Tompkins, William W. Van Ness, Joseph C. Yates, Jonas Platt,

John Woodworth, Jacob Sutherland, William L. Marcy, Samuel Nelson, Greene C. Bronson and Esek Cowen.

The office of attorney-general has successively devolved on Egbert Benson, Richard Varick, Aaron Burr, Morgan Lewis, Nathaniel Lawrence, Josiah Ogden Hoffman, Ambrose Spencer, John Woodworth, Matthias B. Hildreth, Abraham Van Vechten, Martin Van Buren, Thomas J. Oakley, Samuel A. Tallcott, Greene C. Bronson, Samuel Beardsley, Willis Hall and George P. Barker.

While the legislature was busily engaged in modifying the municipal law, the higher courts were not less assiduous in expounding the new statutes. But the materials for writing the judicial history of the state previously to 1805, are very scanty, and are chiefly traditionary. The practice in the supreme court was modeled after that of the king's bench in England, and its complexity and uncertainty rendered it difficult of attainment. Not only was the practice in the court of chancery more mysterious, but the principles of equity, and the rules controling their application, were to be learned by the few only who at that day had access to expensive English works. The science of the law at that early period was less understood than now, while its professors were held in high veneration, as the priests of mysteries too profound to be explored by common minds. In 1794, "A treatise on the practice of the supreme court of judicature of the state of New-York, in civil actions," was published "by William Wyche, of the Honorable Law Society of Grey's Inn, London, and citizen of the United States of America," and with the motto "*Lex mundi harmonia.*" This little work was well executed, and there are yet some among us who found it useful in relieving them from the difficulties of separating what was applicable here from the intricate forms of practice in the English courts.

William Coleman and George Caines, in 1794, commenced collecting reports of cases of practice in the supreme court, and published the results in 1805. George Caines also gathered notices of important cases adjudicated in the court for the correction of errors. The same author, in 1808, published a treatise on the practice of the supreme court. The occasional reports thus published, pre-

pared the way for more regular and careful reports by William Johnson, of the decisions made in the three higher tribunals of the state. Those of the supreme court, and court for the correction of errors, now fill fifty volumes, of which twenty were published by Mr. Johnson, nine by Esek Cowen, twenty by John L. Wendell, and one by Mr. Hill, the present reporter.

Chancellor Kent introduced the system of reporting in the court of chancery, and we have now fifteen volumes of such reports, seven of which were prepared by William Johnson, one by Samuel Miles Hopkins, and seven by Alonzo C. Paige. These various reports contain a large mass of adjudications on constitutional law and statutory enactments and the application of the common law, and principles of equity, to the multifarious questions of rights and duties arising in a rapidly increasing community; and are held in the highest respect by the people of this state, and deemed a necessary part of the library of every lawyer in the United States. The talents and learning of judge Benson have always been held in high respect; but the honor of introducing method and order into our jurisprudence, and elucidating its principles and their application, rests chiefly with James Kent and Ambrose Spencer, and their associates on the bench of the supreme court. Since their retirement from the judiciary, the responsibilities of judges have vastly increased in regard to the number of causes to be heard and adjudicated; and although generally it is hazardous to speak of contemporaries, yet we may safely affirm that the courts have continued to maintain an eminent character for profound and varied learning.

The names of some of our lawyers have been already mentioned. We may add those of Richard Harrison, Richard Varick, Thomas Addis Emmet, John Wells, John V. Henry, Elisha Williams, Abraham Van Vechten, Henry R. Storrs, Samuel Miles Hopkins, Thomas R. Gold, who are deeply lamented not only as eminent lawyers, but as useful and honored citizens. Our contemporaries will perhaps allow us to add the names of some who, although living have withdrawn from the contests of the forum, and whose established fame is now the

property of the bar of the state, such as Samuel Jones, Thomas J. Oakley, Martin Van Buren, John Duer and John C. Spencer.

Chancellor Kent retired from the arduous and honorable duties of the court of chancery, unwearied by judicial labors and unimpaired by age, although he had reached the climacteric at which the constitution declares an incumbent disqualified. He then employed himself in reducing to a system the confused mass of American jurisprudence, as it was found in the reports of the United States tribunals, and of the courts of more than twenty of the states. This great work he accomplished so successfully, that his commentaries have superseded, as an elementary book, all other compilations, and is received with the respect due to authority throughout the union. Our law libraries are chiefly made up of English works, reprinted with notes of American decisions and statutes. There have been few original publications on elementary law, and the list of writers in the legal profession is by no means extensive. We have a profound and philosophical essay on the law of contracts by Gulian C. Verplanck, who has also distinguished himself by many elaborate opinions, delivered while he was a senator, in the court of errors; a treatise on the constitution of the United States, by Alfred Conkling; an essay on new trials, and a treatise on the practice of the supreme court, by David Graham junior; a manual of law for the use of business men, by Amos Dean; "The office and duties of masters in chancery," and a treatise on the practice in chancery, by Murray Hoffman; Blake's chancery practice; Dunlap's practice; and a work on the same subject, by Paris & Duer.

Leaving this imperfect notice of the bar and its learning, and returning to the subject of political science, we may mention "A sketch of the finances of the United States, by Albert Gallatin," published in 1796, which, on account of the general views it contains in respect to revenue and taxation, deserves to be classed among discussions in the science of political economy. The sketch referred to contained a very comprehensive and lucid view of the financial system of the United States, as put in operation after the organization of the government under

the constitution. It did not merely set forth the actual condition of the finances, but was interspersed with much clear and forcible reasoning in relation to the wisdom of particular features of the revenue system, as it then existed. The subjects of taxation and public debt and their effects, the different species of revenue, and the expenditures of the government, were discussed by Mr. Gallatin with a degree of ability and acuteness, which indicated a familiar acquaintance with financial questions, and strong powers of reasoning. The work contained pointed objections to some of the early measures of the federal government, which were recommended by general Hamilton, and particularly the assumption of the debts of the states by the general government; but its tone throughout was calm, dignified and elevated.

From its bearing upon one of the great questions of the day, viz. the extent to which protection to the manufacturing industry of the United States was necessary — the following position assumed by Mr. Gallatin is deemed worthy of notice: "As every further increase of population in many of the states diminishes the relative quantity of land and of produce raised, and promotes the establishment of manufactures; our exports of raw materials, our importations of those articles we can manufacture, and the revenue raised upon such articles, although all of them gradually augmenting, will, unless favored by accidental causes, increase in a ratio less than our population." He, however, maintained that for the purposes of revenue the impost should be the principal reliance of the country; and that when this was carried as far as prudence would dictate, the great source of taxes upon consumption must be considered as nearly exhausted, and that the other great branch of revenue, lands, must be made to contribute by direct taxation. On the subject of public debt, and its effects, Mr. Gallatin's observations are able and philosophical.

In the year 1826, a discourse was delivered at Schenectady, before the literary societies of Union College, by Samuel Young, Esq. on the subject of political economy. It traced the rise and progress of the science through its various phases, from the commercial or mercantile theory, to the more orderly and ra-

tional system introduced by Adam Smith. The discourse was written with purity and beauty of language, and illustrated with great clearness the received principles of the science. Mr. Young pointed out the evil effects of a public debt upon a community, and the indispensable duty of governments to practise the most rigid frugality and economy. He objected to usury laws as tending to promote the very evil they were designed to eradicate, and to eleemosynary establishments, maintained at the public expense, as encouragements to pauperism. The general scope of Col. Young's address was in harmony with the principles stated by Adam Smith, though he conceded that, in the incipient stages of a domestic manufacture, it might need and properly receive the aid of government, being left, as soon as it had passed the precarious period of infancy, to that free competition and that keen sighted self-interest, which he believed to be the best regulators of human industry.

An essay on credit, currency and banking, by Eleazer Lord, published in 1834; a treatise on political economy, by the reverend Alonzo Potter; and suggestions on the banks and the currency, published within the last year, by Albert Gallatin, deserve a place among the writings of citizens of New-York, in the department of political economy. These several works discuss questions which yet remain subjects of political controversy, and present the various arguments by which many conflicting opinions of the day are supported; but all are distinguished by the spirit of candid inquiry, or honest conviction.*

The convention which assembled in 1821 to revise the constitution of the state, presented an occasion when many of the fundamental principles of the science of government before regarded as settled, were subjected to a close and searching examination. Rufus King, who had been long distinguished as a senator from this state in the senate of the United States, and as a representative of the United States at the court of St. James, expressed in an opening speech what were probably the prevalent feelings of the convention. "Although," said he,

* Notes on the history of the science of political economy were received from the Honorable JOHN A. DIX, and from HORACE GREELEY, Esq.

"I fully concur in the fitness and expediency of this convention; and although I am fully of opinion that the change of circumstances and political relations in our country have imperiously required the interposition of the people to revise the constitution, yet it is my hope that the convention may proceed with great caution and moderation. Not only," said he, "are the great principles of free government which arise from, and are sustained by, the intelligence and virtue of the people, denied by the great nations of the old world, but a contrary and most slavish doctrine is proclaimed and enforced by them; a doctrine which falsely assumes that a select portion of mankind only are set apart by Providence, and made solely responsible for the government of mankind. In contradiction to this theory it is our bounden duty to make it manifest to all men, that a free people are capable of self-government; that they can make, and abate, and remake their constitution; and that, at all times, our public liberties, when impaired, may be renovated, without destroying those securities which education and manners, our laws and constitutions, have provided."

The governor, chancellor, chief justice and justices of the supreme court, under the old constitution, were a council to revise bills which passed both houses; and bills which were returned with objections failed to become laws, unless they received the votes of two-thirds of the members. A committee proposed to abolish this part of the constitution, and to confide the revising power to the executive alone, but to retain the provision declaring that bills should become laws if passed by two-thirds of the members of both houses. The proposition to abolish the council of revision was unanimously adopted. Ambrose Spencer, then chief justice, admitted the expediency of separating the judges from the legislative power, but opposed with zeal the vesting the power in the governor, unless he was made more independent of the legislature. Peter R. Livingston strenuously labored to obtain such a modification of the proposed amendment as would permit bills, returned with objections, to pass, if they should then receive the votes of two-thirds of the members *elected* to each house. Jonas Platt, then a justice of the supreme court, and member of the council of

revision, very earnestly insisted upon some more effective check on hasty and improper legislation than he thought would be secured by the veto of the governor dependent, (as it was supposed he would be,) on the legislature. Erastus Root opposed these views and supported the amendment, declaring, with his customary energy, that he deprecated the firmness which grew out of an independence of the popular voice to oppose the popular will. Chancellor Kent expressed his apprehension "that the sober minded people of the state would not be satisfied to see so important a column of the constitution destroyed, without having it replaced by something more efficient in its character, and useful in its operation," than the qualified veto which was proposed. James Tallmadge supported the proposition in a speech of great ability, and evincing deep research into the history of government. Daniel D. Tompkins, who was the president of the convention, approved the principle of a qualified negative upon legislation, but opposed the conferring that power upon the governor alone, and proposed to establish a council to consist of the governor, lieutenant-governor, and attorney-general and others. He also proposed to confine the powers of the governor's veto to cases in which unconstitutional laws were offered for his signature. Abraham Van Vechten, Samuel Young and John Duer, approved the plan proposed by the committee, and it was finally adopted.

Under the former constitution, the pardoning power was vested in the governor, except in capital cases. That power was now conferred on the governor, with unlimited power to pardon in all cases except treason; after a debate in which Mr. Tompkins, Ogden Edwards, David Buel junior, Samuel Nelson and Peter R. Livingston, endeavored to procure an amendment, by which the governor should be obliged to assign reasons for granting executive clemency; which proposition was opposed by Mr. Kent, Mr. Platt and others, Mr. Root endeavored to retain the legislative power of pardon in capital cases.

The power to prorogue the legislature, conferred by the old constitution, was abolished, on motion of Mr. Root; but the convention was at one time almost equally divided on the question.

The term of the executive office, under the old constitution, was three years. It was now reduced to two; thirty-one members voting in favor of continuing the term three years; sixty-one voting to fix the term at two years, and fifty-nine for reducing it to one year.

Mr. Root made an unsuccessful effort to procure a provision in the constitution, inhibiting courts from granting new trials, after two verdicts had been rendered. Mr. Duer made a like effort to incorporate in the constitution an article, declaring that indictments should not be found for what was resolved in meetings of the people, peaceably convened to consider the action of the government.

The debates in the convention disclosed the fact, that there were three opinions among its members on the question of suffrage. One of them contemplated retaining the qualification of a freehold, valued at two hundred and fifty dollars, as a condition of suffrage for senators. Nineteen members voted for this proposition, viz. Messrs. Bacon, Fish, Hees, Hunter, Huntington, Jay, Jones, Platt, Rhinelander, Rose, Sanders, I. Smith, Spencer, Sylvester, Van Horne, Van Ness, Van Vechten, E. Williams and Woods. A second opinion was favorable to universal suffrage by white persons. This opinion was supported by Mr. Root, Mr. Tompkins, Mr. Radcliff and Mr. Young. The third opinion was conservative and midway between the extremes; and it was supported by Mr. Van Buren, King, Sutherland, Duer, Nelson and Nathan Williams. The result was a compromise between these conflicting opinions. But so strong was the popular sentiment in favor of universal suffrage, that the constitution was amended five years afterwards, so as to dispense with all other restrictions than those which are specified in our synopsis of that instrument.* The exclusion of colored persons from suffrage, unless they had freeholds valued at two hundred and fifty dollars, was carried by a vote of seventy-one to thirty-three, and was based upon the ground that the African race were in a condition of hopeless degradation and ignorance. The proposition was opposed with great zeal and ability by Peter A. Jay.

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* Hammond's History.

One of the chief causes of discontent under the old constitution, was the manner in which the appointing power had been exercised by the council of appointment, which consisted of the governor and four senators chosen by the assembly. The council was abolished with great unanimity, many offices were rendered elective, and the power to fill others was distributed among several departments and functionaries, without important division among the members as to the principles of distribution.

It would be inconvenient to extend our notice of the convention. What has been written, will, perhaps, be sufficient to show the spirit which prevailed in its deliberations, and to indicate some of the members who were influential in giving direction to its measures.

The year 1825 was signalized by the commencement of an undertaking which marks an era in the jurisprudence of the state. An act was passed, directing that all the existing statute laws should be revised and reduced into the form of a code, to be submitted to the legislature for review. This important duty was confided to John Duer, Benjamin F. Butler and Henry Wheaton. Mr. Wheaton resigned the trust, and his place was filled by John C. Spencer. The gentlemen thus constituting the commission, were three years engaged in performing its duties; and the legislature, on receiving their reports from time to time, passed upon the same, until in January, 1829, a perfect code was completed in four parts, as follows: Part I. Concerning the territorial limits and divisions, the civil polity, and the internal administration of the state; Part II. Concerning the acquisition, the enjoyment, and the transmission of real and personal property, the domestic relations, and other matters connected with private rights; Part III. Concerning courts and ministers of justice, and proceedings in civil cases; and Part IV. Concerning crimes and punishments, proceedings in criminal cases and prison discipline. The execution of this intricate and extensive work, has been regarded by many enlightened men as a great advance towards the establishment of an unique and complete code. But the public mind is not now engaged in considering the practicability or expediency of such a measure.

The geographical position of the United States, and our principles of government, are alike unfavorable to conquest and military ambition. The popular mind has its action, therefore, directed towards physical improvement and the melioration of the condition of society; and in this state it has been especially engaged in improving those interior communications necessary to the maintenance of intimate political and social relations, the exchange of supplies, and provision for the public defence.

The destiny of our country seems to have been opened to the mind of Washington, with a clearness almost equal to that with which the varied career of the chosen people was revealed to their prophetic leader on the sublime occasion when he was required to resign the trust he had so long faithfully discharged. Washington saw, that although the settlements of the United States had been clustering on the Atlantic coast during almost two centuries, yet the region, far more extensive, fertile and salubrious, which lay beyond the proper borders of the thirteen states, would become the home of the larger portion of the American family; and that if the natural barriers between that region and the east should remain unchanged, the west would, at no distant period, refuse political connection with the maritime states; but that if those barriers could be surmounted by roads, and pierced by canals, connecting the inland lakes and rivers with tide water, the wealth and population of the whole country would be vastly increased; ample provision would be made for defending every part of our extended borders; and the states, new and old, would be bound "in an indissoluble union of interest and affection." In 1783, when he had proceeded up the difficult navigation of the Mohawk to Fort Stanwix, now the site of the village of Rome, and had crossed to Wood creek, which flows into Oneida lake, and thence had descended to the sources in this state of the Susquehannah, he gave expression to this glowing thought: "Taking a contemplative and extensive view of the vast inland navigation of the United States, I could not but be struck with the immense diffusion and importance of it, and with the goodness of that Providence

who has dealt his favors to us with so profuse a hand. Would to God we may have wisdom to improve them!"*

Ideas like these soon afterwards engaged the attention of philosophic minds throughout the states, and it was perceived that in thus improving the inland navigation of the continent, the route for a communication between the inland waters and the sea, which should secure to itself the trade of the valley between the Allegany mountains and the Mississippi, would become an object of zealous competition.

The ocean, receiving homage through the valleys of the Mississippi and Ohio, the Potomac, the Susquehannah, the Delaware, the Hudson and the St. Lawrence, seemed to invite through those various channels the accomplishment of the stupendous project.

By removing obstructions to the navigable flow of the continuous waters of the great lakes and of the St. Lawrence, ship navigation might be grasped six hundred miles up that river, and extended around the Falls of Niagara into the waters of Lake Erie.

Citizens of Pennsylvania proposed to accomplish the same great purpose, by alternative land and water communications, surmounting the Alleganies, and employing in the transit between the Delaware and the lakes the waters of the Susquehannah and the Allegany.

The project of Maryland comprehended a diversion of trade from the Pennsylvania route at Pittsburgh, and a passage to tide water through the Potomac.

The comprehensive sagacity of Washington, as early as 1784, marked out a plan for securing to Virginia the trade of the regions in the vicinity of the lakes, by connecting the navigable waters of James river by portages, or other communications, with those of the Kenhawa, the Muskingum, and the rivers flowing into lake Erie.†

The Mississippi offered an easy descending navigation almost from the shores of the lakes to the Gulf of Mexico. But the keys of the St. Lawrence and the

* WASHINGTON'S letter to the Marquis of Chastellux. † WASHINGTON'S letter to Governor Harrison.

Mississippi, which were the most obvious channels, were held by foreign powers; and neither their enterprise nor the condition of their colonies favored the spirit of competition which had been awakened in the new republic.

New-York furnished a navigation through the Hudson, one hundred and eighty miles from tide water, and facilities for constructing a continuous channel for inland navigation across an almost level isthmus, which separated the great eastern lakes from the valley through which that river poured its deep and ample volume into the ocean; an isthmus, which in its various width no where exceeded three hundred and sixty miles.

The proximity of the great lakes to the valley of the Hudson, was understood at a very early period. Governor Burnet, in 1720, found the Six Nations receiving from French traders by the way of Montreal, merchandise which had been carried there from Albany. The friendship of the Indians naturally followed this commerce. Burnet, with a view to detach the Iroquois from the French interest, caused a fort to be erected at Oswego, and trading houses to be built at the mouth of the Oswego river, "on account of its water communications, and for the facility of transportation between the lakes and Schenectady, there being but three portages in the whole route, and two of them very short."* Dr. Cadwallader Colden, then surveyor-general of the province, addressed to governor Burnet a memoir on the fur trade, which contained an account of the western rivers, portages and lakes, and in which we find this very bold suggestion: "If one considers the great length of the river (the Mississippi), and its numerous branches, he must say, that by means of the river and the lakes, there is opened to his view such a scene of inland navigation as cannot be paralleled in any part of the world."† Kalm and Carver, early European travellers, were struck with the same peculiar features of our territory. Sir Henry Moore, governor in 1768, in a speech to the provincial assembly, noticed the difficulties of trade with the Iroquois, in consequence of the obstructions in the navigation between Schenectady

* Dunlap. † C. D. Colden's Memoir of N. Y. Canals.

and Fort Stanwix, "occasioned by the falls of Canajoharie," under which description was undoubtedly meant the rapids at Little Falls; and he suggested that "the obstructions could easily be obviated by the use of sluices upon the plan of the great canal of Languedoc."

In 1784, Christopher Colles, of New-York, submitted to the legislature proposals for removing obstructions to the navigation of the Mohawk river, so that boats of burthen might pass the same. That body mingled considerations of economy with those of enterprise in their views of the subject, and offered to secure to the projector and his associates, the perpetual profits to be derived from the navigation of the river, if improved by them. At the next session the legislature granted to Mr. Colles one hundred and twenty-five dollars, to enable him to prosecute his examination of the river. He appeared again before that body, and before the public, with a proposition to form an association to improve the inland navigation between Oswego and Albany; and the publication is said to have exhibited good foresight of the advantages which would result from the proposed connection, as well as a right understanding of the facility with which it could be accomplished. But no public action crowned his labors. The plan he proposed was thought quite too visionary. He died in obscurity, and was interred in "the burying ground of strangers," about 1820, while the project he had promulgated was, on a vastly more extended scale, proceeding to its consummation.*

George Clinton, governor, in 1791, stated to the legislature that the frontier settlements, freed from apprehensions of danger, were rapidly increasing, and must soon yield extensive resources for profitable commerce, and that this consideration forcibly recommended the policy of continuing to facilitate the means of communication with them, as well to strengthen the bands of society, as to prevent the produce of those fertile districts from being diverted to other markets. The senate and assembly thereupon appointed a committee to inquire what obstructions in the Hudson and Mohawk rivers ought to be removed. The

* C. D. Colden's Memoirs.

committee, consisting of Ezra L'Hommedieu, John Cantine, Philip Schuyler and Alexander Webster, of the senate; James Livingston, Jonathan Brown, Jacob Delamater, John D. Coe, Zina Hitchcock, Samuel L. Mitchill and John Smith, of the assembly, reported a bill, entitled "An act concerning roads and inland navigation," which became a law, and which directed the commissioners of the land-office to cause the country to be explored, between Fort Stanwix and Wood creek, in Herkimer county, and a similar survey to be made between the Hudson and Wood creek, in Washington county. The law further directed the commissioners to make an estimate of the expense of constructing canals on those routes. The commissioners submitted a favorable report, and governor Clinton, at the next session, commended the subject earnestly to the consideration of the legislature. Thereupon a law was passed, entitled "An act for establishing and opening lock navigation within this state." The act commenced with the terse recital "Whereas a communication by water between the southern, northern and western parts of this state will encourage agriculture, promote commerce and facilitate a general intercourse between the citizens;" and provided for the incorporation of two associations, the Western Inland Lock Navigation Company, and the Northern Inland Lock Navigation Company. The purpose of the western company was to open a lock navigation from the Hudson river to Lake Ontario and the Seneca lake; and that of the northern company was to connect the same river with Lake Champlain. The act appointed as directors in the two companies, Philip Schuyler, Leonard Gansevoort, Jeremiah Van Rensselaer, Elkanah Watson, John Tayler, Jellis A. Fonda, William North, Goldsbrow Banyar, Daniel Hale, John Watts, Walter Livingston, Dominick Lynch, James Watson, Matthew Clarkson, Ezra L'Hommedieu, Melancton Smith, David Gelston, Stephen Lush, Cornelius Glen, Silas Talbot, John Frey, Douw Fonda, John Sanders, Nicholas J. Roosevelt, Daniel McCormick, Marinus Willet, Jonathan Lawrence, Philip Van Cortlandt, James Clinton, Abraham Ten Broeck, John Williams, Stephen Van Rensselaer, Jacobus Van Schoonhoven, John Van Rensselaer, Abraham G. Lansing, Henry Quackenbush, Robert R. Livingston, Philip Livingston, James Duane,

Alexander Macomb, Samuel Jones, Nicholas Low, Dirck Lefferts, William Duer, Barent Bleecker, Henry Livingston, Peter Gansevoort, Peter B. Tearce, Alexander Webster, George Ray, Thomas Tillotson, Matthew Scott, Zephaniah Platt, John Thurman, Albert Pawling and Zina Hitchcock. Out of this array of names combining so large a representation of the talents, learning, patriotism, enterprise, political influence and wealth of this state, it is not invidious to select that of Philip Schuyler, who, now enjoying well earned military fame, exhibited the most untiring devotion to the physical improvement of his country. The capital stock of both the companies was $50,000, a sum so small as to show a very inadequate estimate of the difficulties of the comprehensive scheme which was then shadowed forth.

The art of constructing canals was little understood, and the topography of the country was not accurately ascertained. The enterprise of the western company fell into discredit. Many of the stockholders forfeited their shares, but a few, more persevering, prosecuted the undertaking, and established an imperfect canal a little less than three miles long, with five locks, around the Little Falls; a canal of one and a quarter miles, at the German flats; a canal one mile and three-fourths, from the Mohawk to Wood creek, and several wooden locks on that stream. So defective were these works, that they were twice reconstructed during the short period which intervened before the commencement of the Erie canal; and yet so costly, that the company expended four hundred thousand dollars in opening a passage for loaded boats of small burthen, from Schenectady to the Oneida lake. Although steadily favored by the legislature with loans and subscriptions of stock, the company, becoming discouraged and exhausted, relinquished the design of extending their navigation to Lake Ontario. In 1798, an association was incorporated to construct a canal around the Falls of Niagara, on an application by James Watson, Charles Williamson, John Williams, Effingham Embree and their associates; but the law was not executed. The Northern Inland Lock Navigation Company, after a brief effort to procure subscriptions, abandoned the enterprise with which that association had been charged.

During several years after the western company had commenced its improvements, charters were granted to associations which proposed to remove obstructions in the St. Lawrence, the Seneca and other rivers; but none of those companies achieved any effective improvement, except the Seneca Lock Navigation Company, which made an imperfect navigation between the Oswego river and the Cayuga and Seneca lakes.

To Gouverneur Morris, history will assign the merit of first suggesting a direct and continuous communication from Lake Erie to the Hudson. In 1800, he announced this idea from the shore of the Niagara river to a friend in Europe, in the following enthusiastic language: "Hundreds of large ships will, in no distant period, bound on the billows of these inland seas. Shall I lead your astonishment to the verge of incredulity? I will. Know then that one-tenth part of the expense borne by Britain in the last campaign, would enable ships to sail from London through the Hudson river into Lake Erie. As yet we only crawl along the outer shell of our country. The interior excels the part we inhabit in soil, in climate, in every thing. The proudest empire of Europe is but a bauble compared to what America may be, must be."* The praise awarded to Gouverneur Morris must be qualified by the fact, that the scheme he conceived was that of a canal with an uniform declination, and without locks, from Lake Erie to the Hudson.† Morris communicated his project to Simeon De Witt in 1803, by whom it was made known to James Geddes in 1804. It afterwards became the subject of conversation between Mr. Geddes and Jesse Hawley, and this communication is supposed to have given rise to the series of essays written by Mr. Hawley, under the signature of Hercules, in the Genesee Messenger, continued from October, 1807, until March, 1808, and which first brought the public mind into familiarity with the subject.‡ These essays, written in a jail, were the grateful return, by a patriot, to a country which punished him with imprisonment for being unable to pay debts owed to another citizen, and displayed deep re-

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* Elkanah Watson's History of the Canals. † Colden's Memoirs. ‡ Letter of Simeon De Witt.

search, with singular vigor and comprehensiveness of thought, and traced with prophetic accuracy a large portion of the outline of the Erie canal.*

In 1807, Albert Gallatin, then secretary of the treasury, in pursuance of a recommendation made by Thomas Jefferson, president of the United States, reported a plan for appropriating all the surplus revenues of the general government to the construction of canals and turnpike roads; and it embraced in one grand and comprehensive view, nearly without exception, all the works which have since been executed or attempted by the several states in the union. This bold and statesmanlike, though premature, conception of that eminent citizen, will remain the greatest among the many monuments of his forecast and wisdom.

In 1808, Joshua Forman, a representative in the assembly from Onondaga county, submitted his memorable resolution, "Whereas the president of the United States did, by his message to congress, delivered at their meeting in October last, recommend that the surplus moneys in the treasury, over and above such sums as could be applied to the extinguishment of the national debt, be appropriated to the great national project of opening canals and making turnpike roads: And whereas the state of New-York, holding the first commercial rank in the United States, possesses within herself the best mode of communication between the Atlantic and western waters, by means of a canal between the tide waters of the Hudson river and Lake Erie, through which the wealth and trade of that large portion of the union, bordering on the upper lakes, would forever flow to our great commercial emporium: And whereas the legislatures of several of our sister states have made great exertions to secure to their own states the trade of that widely extended country west of the Allegany, under natural advantages vastly inferior to those of this state: And whereas it is highly important that those advantages should as speedily as possible be improved, both to preserve and increase the commercial and national importance of this state: Therefore, resolved, if the honorable the senate concur herein, that a joint committee be appointed to take

* Jesse Hawley lived to see the Erie canal completed, and two-thirds of it reconstructed and enlarged. He died in 1841.

into consideration the propriety of exploring and causing an accurate survey to be made of the most eligible and direct route for a canal, to open a communication between the tide waters of the Hudson river and Lake Erie, to the end that congress may be enabled to appropriate such sums as may be necessary to the accomplishment of that great national object."

This resolution was adopted, and John Tayler, John Nicholas and Jonathan Ward, on the part of the senate, and Thomas R. Gold, William W. Gilbert, Obadiah German and James L. Hogeboom, on the part of the assembly, constituted the committee.

Mr. Gold submitted a report, not less eloquent in language than elevated in sentiment, in which he stated, that while the subject presented to the government of the United States, in removing natural barriers, and drawing together and preserving in political concord the distant parts of a widely extended empire: an object inviting to patriotism, and interesting to its reputation, the commercial interests of this state impelled to the most strenuous efforts in promoting the same object. That in tracing the vestiges of ancient states, in whose councils munificence, guided by wisdom, presided, the remains of commercial improvement in public canals, and other undertakings, marked the advanced state of society, and attested the empire of the arts of peace; that while military achievement had shed lustre on nations, works of public utility, tending to the happiness and welfare of society, recorded the exercise of superior virtues, and afforded better monuments of true and lasting glory; that with these sentiments the citizens of this state had witnessed with high satisfaction the conduct of the executive of the United States, in recommending an appropriation of a portion of the surplus revenue for improving, by canals, the inland navigation of the country; and that while this state would forbear to derogate from the claims of others, she felt warranted in presenting to the government of the Union, her own territory, as preëminently distinguished for commercial advantages.

In pursuance of a recommendation by the committee, a resolution unanimously passed both houses, directing the surveyor-general, Simeon De Witt, to cause an

accurate survey to be made of the various routes proposed for the contemplated communication. But how little the magnitude of that undertaking was understood, may be inferred from the fact that the appropriation made by the resolution to defray the expenses of its execution, was limited to the sum of six hundred dollars.

There was then no civil engineer in the state. James Geddes, a land surveyor, who afterwards became one of our most distinguished engineers, by the force of native genius and application in mature years, levelled and surveyed under instructions from the surveyor-general, with a view to ascertain, first, whether a canal could be made from the Oneida lake to Lake Ontario, at the mouth of Salmon creek; secondly, whether a navigation could be opened from the Oswego falls to Lake Ontario, along the Oswego river; thirdly, what was the best route for a canal from above the Falls of Niagara to Lewiston; and fourthly, what was the most direct route, and what the practicability of a canal from Lake Erie to the Genesee river, and thence to the waters running east to the Seneca river. The topography of the country between the Seneca river and the Hudson, was at that time comparatively better known. Mr. Geddes' report showed that a canal from Lake Erie to the Hudson was practicable, and could be made without serious difficulty. In 1810, on motion of Jonas Platt, of the senate, who was distinguished throughout a pure and well spent life, by his zealous efforts to promote this great undertaking, Gouverneur Morris, De Witt Clinton, Stephen Van Rensselaer, Simeon De Witt, William North, Thomas Eddy and Peter B. Porter, were appointed commissioners "to explore the whole route for inland navigation from the Hudson river to Lake Ontario, and to Lake Erie." Cadwallader D. Colden, a contemporary historian, himself one of the earliest and ablest advocates of the canals, awards to Thomas Eddy the merit of having suggested this motion to Mr. Platt, and to both these gentlemen that of engaging De Witt Clinton's support, he being at that time a member of the senate.*

* Colden's Memoir.

Another writer* commemorates the efficient and enlightened exertions, at this period, of Hugh Williamson, who wrote with reference to the contemplated improvement, papers, entitled "Observations on Navigable Canals," and also "Observations on the Means of Preserving the Commerce of New-York," which were published in magazines of that day. The canal policy found, at the same time, earnest and vigorous supporters in the American and Philosophical Register, edited by Dr. David Hosack and Dr. John W. Francis.

The commissioners, in March, 1811, submitted their report written by Gouverneur Morris, in which they showed the practicability and advantages of a continuous canal from Lake Erie to the Hudson, and stated their estimate of the cost at five millions of dollars, a sum which they ventured to predict would not exceed five per cent of the value of the commodities which, within a century, would be annually transported on the proposed canal. We may pause here to remark, that the annual value of the commodities carried on the canals, instead of requiring a century to attain the sum of one hundred millions, reached that limit in twenty-five years. "By whom," added the commissioners, "shall the needful expense of the construction of the work be supported? We take the liberty of entering our feeble protest against a grant to private persons or companies. Too great a national interest is at stake. It must not become the subject of a job or a fund for speculation. Among many other objections there is one insuperable, that it would defeat the contemplated cheapness of transportation. * * * * * It remains to determine whether the canal shall be at the cost of the state or of the union. If the state were not bound by the federal band with her sister states, she might fairly ask compensation from those who own the soil along the great lakes, for giving permission to cut the canal at their expense; or her statesmen might deem it still more advisable to make the canal at her own expense, and take for the use of it a transit duty, raising or lowering the impost, as circumstances might direct, for her own advantage. This might

* Dr. Hosack.

be the better course if the state stood alone, but fortunately for the peace and happiness of all, this is not the case. We are connected by a bond which, if the prayers of good men are favorably heard, will be indissoluble. It becomes proper, therefore, to resort for the solution of the present question to the principles of distributive justice. That which presents itself is the trite adage, that those who participate in the benefit should contribute to the expense. The commissioners presume not to go one step farther. The wisdom, as well as the justice, of the national legislature, will no doubt lead to the exercise, on their part, of prudent munificence; but the proportion, the condition, the compact, in short, must be the subject of treaty."

On the presentation of this report, De Witt Clinton introduced a bill, which became a law on the 8th of April, 1811, under the title of "An act to provide for the improvement of the internal navigation of this state." This law began with the expressive recital, that "Whereas, a communication by means of a canal navigation between the great lakes and Hudson's river, will encourage agriculture, promote commerce and manufactures, facilitate a free and general intercourse between different parts of the United States, and tend to the aggrandizement and prosperity of the country, and consolidate and strengthen the union;" and added Robert R. Livingston and Robert Fulton to the board of commissioners, and authorized them to consider all matters relating to such inland navigation, with powers to make application in behalf of the state to congress, or to any state or territory, to coöperate and aid in the undertaking, and to ascertain whether loans could be procured on advantageous terms on the credit of the state, for the purpose of constructing the canal, and the terms on which the Western Inland Lock Navigation Company would surrender their rights and property.

Two of the commissioners, Mr. Morris and Mr. Clinton, repaired to the federal capital, and submitted the subject to the consideration of the president (Mr. Madison) and of congress. In 1812, the commissioners reported that, although it was uncertain whether the national government would do any thing, it cer-

tainly would do nothing which would afford immediate aid to the enterprise; that Tennessee had instructed her representatives in congress to support any laudable application for aid in relation to the canal navigation between Hudson's river and the great lakes; that New-Jersey had declined to render assistance, because she had not sufficient means to complete her own plans of improvement already projected; that Connecticut, for the reasons that she could not supply money, and that she reposed full confidence in the wisdom of her representatives in congress, deemed it inexpedient to take any measures on the subject; that Massachusetts, in language characteristic of the impartial and dignified wisdom of conscious greatness, had instructed her representatives to use their influence in favor of the application of New-York; that Ohio fully approved the plan, while the youthful territory of Michigan (looking probably down the St. Lawrence, as well as across to the Hudson) was of the opinion that the proposed communication was not so desirable as a canal around the cataracts of Niagara, and another passing the falls of Oswego.

The commissioners then submitted that, having offered the canal to the national government, and that offer having virtually been declined, the state was now at liberty to consult and pursue the maxims of policy, and these seemed to demand imperatively that the canal should be made by herself, and for her own account, as soon as the circumstances would permit; and that, whether the subject was considered with a view to commerce and finance, or on the more extensive scale of policy, there would be a want of wisdom, and almost of piety, in neglecting to employ for public advantage, those means which Divine Providence had placed so completely within her power. They estimated the ultimate income of the canal at one million two hundred and fifty thousand dollars; a revenue adequate to defray the cost of the enterprise. With the earnestness so characteristic of Mr. Morris, the report proceeds: "Things which twenty years ago a man would have been laughed at for believing, we now see. At that time the most ardent mind, proceeding on established facts by the unerring rules of arithmetic, was obliged to drop the pen at results which imagination could not embrace. Under

circumstances of this sort, there can be no doubt that those microcosmic minds which, habitually occupied in the consideration of what is little, are incapable of discerning what is great, and who already stigmatize the proposed canal as a romantic scheme, will not unsparingly distribute the epithets, absurd, ridiculous, chimerical, on the estimate of what it may produce. The commissioners must, nevertheless, have the hardihood to brave the sneers and sarcasms of men, who, with too much pride to study, and too much wit to think, undervalue what they do not understand, and condemn what they cannot comprehend." The commissioners, imbued with the spirit of philosophic prophecy, add, "The life of an individual is short. The time is not distant, when those who make this report will have passed away. But no term is fixed to the existence of a state; and the first wish of a patriot's heart is, that his own may be immortal. But, whatever limit may have been assigned to the duration of New-York, by those eternal decrees which established the heavens and the earth, it is hardly to be expected that she will be blotted from the list of political societies before the effects here stated, shall have been sensibly felt. And even when, by the flow of that perpetual stream which bears all human institutions away, our constitution shall be dissolved and our laws be lost, still the descendants of our children's children will remain. The same mountains will stand, the same rivers run. New moral combinations will be formed on the old physical foundations, and the extended line of remote posterity, after a lapse of two thousand years, and the ravage of repeated revolutions, when the records of history shall have been obliterated, and the tongue of tradition have converted (as in China) the shadowy remembrance of ancient events into childish tales of miracle, this national work shall remain, bearing testimony to the genius, the learning, the industry and intelligence of the present age."

Passing the advantages which the state must derive from opening a scene so vast to the incessant activity of her citizens, the commissioners discussed and proved her fiscal ability to complete the enterprise. Impressed with the same expansive views which were exhibited in the first efforts of the legislature in

1792, the commissioners adverted to the proposed connection of Lake Champlain with the Hudson river, as one which would certainly tend to preserve brotherly affection in the great American family, and through the reciprocal advantages it would afford to New-York and Vermont, would strengthen the bonds of our union with the eastern states.

On the nineteenth of June, 1812, a law was enacted, reäppointing the commissioners, and authorizing them to borrow money and deposit it in the treasury, and to take cessions of land, but prohibiting any measures to construct the canals.

In the senate, James W. Wilkin, of Orange county, moved to reject the bill. The motion was lost, fifteen to eleven. The assembly divided on the first section, which contained the principle of the bill, and it was sustained by a vote of fifty-one to forty-two. On its being returned to the senate, with an amendment, Erastus Root, of Delaware, moved to postpone the consideration of the amendment until the next session, which would have been equivalent to rejecting the bill. This motion received thirteen votes, while sixteen were recorded against it.

From 1812 to 1815, the country suffered the calamities of war, and projects of internal improvement necessarily gave place to the patriotic efforts required to maintain the national security and honor. But those plans were not altogether forgotten, at least by those who distrusted their wisdom. Although there was much incredulity in regard to the Erie canal, during all the period which we have been considering, yet the design met little or no opposition, so long as it was supposed that the necessary expenditures would be made by the federal government. But a severe scrutiny was encountered, when it was avowed that the means for accomplishing so large a work must be derived from taxation, or from the use of the public credit. Erastus Root, in 1813, submitted a resolution, by which the commissioners were to be called upon for a further report of their proceedings. The commissioners, in their report in 1814, reäffirmed their confidence in the feasibility of the enterprise, and adverted to the facilities which would be found for extending the communication to the valleys watered by the Susquehannah and its branches, whence they inferred that Pennsylvania would,

at a proper time, coöperate in the enterprise. The commissioners also announced that grants of land would be made by the Holland Company of 100,632 acres ; by Le Roy Bayard and McEvers, 2,500 acres; by the heirs of the Pulteney estate, a large tract, and by governor Hornby, 3,500 acres. These cessions were ultimately realized, with a liberal donation from Gideon Granger.

Mr. Root introduced a bill into the senate which two days afterwards passed that body, repealing so much of the act then in force as authorized the commissioners to borrow five millions of dollars. This repeal was a virtual abandonment of the policy of internal improvements. The divisions in the assembly show a majority of eighteen in favor of the repeal; and in the senate the majority was eight. In 1816, after the close of the war, Daniel D. Tompkins, governor, in his annual speech, submitted for the consideration of the legislature, the expediency of prosecuting the canals. Citizens in various parts of the state, and especially in New-York, Albany and Troy, and in the towns and counties situated in the vicinity of the proposed routes, now earnestly applied for vigorous measures to accomplish the objects so long delayed. Among these petitions was a memorial by inhabitants of the city of New-York, from the pen of De Witt Clinton.

The memorialists declared, that since the object was connected with the essential interests of the country, and calculated in its commencement to reflect honor on the state, and in its completion to exalt it to an elevation of unparalleled prosperity, they were fully persuaded that centuries might pass away before a subject would be again presented so worthy of all the attention of the legislature, and so deserving of all its patronage and support — that the improvement of intercourse between different parts of the same country, had always been considered the first duty, and the most noble employment of government — that canals united cheapness, celerity, certainty and safety in the transportation of commodities — that they operated upon the general interests of society, in the same way as machines for saving labor in manufactures; and as to all the purposes of beneficial communication, they diminished the distances between places, and therefore encouraged

the cultivation of the most remote parts of the country—that they created new sources of internal trade, and augmented the old channels, thus tending to enlarge old and erect new towns, increase individual and aggregate wealth, and extend foreign commerce. The memorialists attributed the prosperity of ancient Egypt and China to their inland navigation, and expressed the opinion that England and Holland, if deprived of their canals, would lose the most prolific sources of their prosperity and greatness. Inland navigation, they said, was to the same community what exterior navigation was to the great family of mankind; and that as the ocean connected the nations of the earth by the ties of commerce and the benefits of communication, so did lakes, rivers and canals operate upon the inhabitants of the same country. Applying these general arguments in favor of inland navigation, they showed that a great chain of mountains passed through the territory of the United States, and divided it into eastern and western America; that the former, on account of the priority of its settlement, its vicinity to the ocean, and its favorable position for commerce, had many advantages, while the latter had a decided superiority in the fertility of its soil, the benignity of its climate, and the extent of its territory; that to connect these great sections by inland navigation, to unite our Mediterranean seas with the ocean, was evidently an object of the first importance to the general prosperity; that the Hudson river offered superior advantages for effecting this connection, because it afforded a tide navigation through the Blue ridge or eastern chain of mountains, and ascended above the eastern termination of the Catskill or great western chain, and that no mountains interposed between it and the great western lakes, while the tide in no other river or bay in the United States ascended higher than the Granite ridge, or within thirty miles of the Blue ridge. After showing the importance of the Hudson as a natural channel of trade, one hundred and seventy miles in length, the petitioners showed that the canal would be virtually an extension of that channel three hundred miles through a fertile country, embracing a great population, and abounding with all the productions of industry; and they asked, if the work was so important when viewed in relation to this state alone,

how unspeakably beneficial must it appear when the contemplation should be extended to the great lakes, and the country that surrounded them; waters extending two thousand miles, and a country containing more territory than all Great Britain and Ireland, and at least as much as France. After demonstrating that New-Orleans and Montreal were the only formidable rivals of New-York for the great prize of the western trade, and showing the advantages in that competition which New-York would derive from the proposed Erie canal, a glowing view of its prospective benefits was presented. Leaving to her rivals no inconsiderable portion of the western trade, New-York, said the memorialists, would engross more than sufficient to render her the greatest commercial city in the world. The whole line of the canal would exhibit boats loaded with the various productions of our soil, and with merchandise from all parts of the world; great manufacturing establishments would spring up; agriculture would establish its granaries, and commerce its warehouses, in all directions; villages, towns and cities would line the banks of the canal and the shores of the Hudson from Erie to New-York; the wilderness and the solitary place would become glad, and the desert would blossom as the rose.

The petitioners then presented the superior advantages of a continuous canal from the Hudson to Lake Erie, over one which would terminate at Lake Ontario, with a passage between that lake and Lake Erie around the falls of Niagara. They then showed that the work might be completed by the use of the credit of the state, provision being made to pay the interest on the money borrowed until the canal should become productive of revenue. They urged with earnestness the immediate commencement of the work. Delays, said they, are the refuge of weak minds; and to procrastinate on this occasion is to show a culpable inattention to the bounties of nature, a total insensibility to the blessings of Providence, and an inexcusable neglect of the interests of society. If, they added, it were intended to advance the views of individuals, or to foment the divisions of party; if the scheme promoted the interests of a few at the expense of the prosperity of many; if its benefits were limited as to place, or fugitive as to duration,

then indeed it might be received with cold indifference, or treated with stern neglect; but the overflowing blessing from this great fountain of public good and national abundance, would be as extensive as our country, and as durable as time. The petitioners enforced their eloquent appeal for an immediate commencement of the enterprise, by the considerations that it could not be prosecuted at any future time with less expense; that the longer it was delayed, the greater would be the difficulty in surmounting the interests which would rise up in opposition; that there was an urgent necessity for immediately diminishing the expense of transportation; that it would raise the value of the national domain, and thus cause the speedy extinguishment of the national debt and a diminution of taxes, leaving a considerable source of revenue to be expended in other works of improvement, in encouraging the arts and sciences, in patronizing the operations of industry, in fostering the inventions of genius, and in diffusing the blessings of knowledge; that New-York was both Atlantic and western, and the only state in which an indissoluble union of interest between the great sections of the confederacy could be formed and perpetuated; that she would justly be considered an enemy to the human race, if she did not exert for this purpose the high faculties which the Almighty had put into her hands; and lastly, that the enterprise, as to the countries which it would connect, and as to the consequences which it would produce, was without a parallel in the history of mankind. While, they remarked, the chiefs of powerful monarchies had projected or executed designs which had attracted the admiration of the world, it remained for a free state to create a new era in history, and to erect a work more stupendous, more magnificent and more beneficial than any hitherto achieved by the human race.

Two vacancies had occurred in the canal commission; Robert R. Livingston having died in 1815, which event was followed by the lamented death of Robert Fulton, whereby the friends of internal improvement were deprived of the further coöperation of one, whose services in perfecting steam navigation had conferred such signal benefits on the human race. The board of commissioners was now

composed of Gouverneur Morris, Stephen Van Rensselaer, De Witt Clinton, Simeon De Witt, William North, Thomas Eddy, Peter B. Porter and Charles D. Cooper. They submitted a report, from which Mr. Morris withheld his signature, for the reason, as was said, that his idea of an uniform declivity from Lake Erie to the Hudson, was abandoned.* They expressed a confident belief that the public mind was now prepared for a commencement of the Erie canal; announced that they had assurances that a loan of one million of dollars, at an interest of six per cent, could be obtained, and subsequent sums as fast as should be required; suggested the expediency of constructing first the middle section, extending from Rome to the Seneca river, because it would yield a large revenue, and trade might be thereby diverted from the valley of the St. Lawrence, and again urged the simultaneous prosecution of the Champlain canal.

The joint committee on canals, at this session, consisted of William Ross, George Tibbits, Philetus Swift and Peter R. Livingston, of the senate, and Jacob R. Van Rensselaer, Thomas J. Oakley, William Thompson, James Lynch, Benjamin Mooers, Myron Holley, William D. Ford and George Warner, of the assembly. Mr. Van Rensselaer, from that committee, introduced a bill providing for the immediate commencement of both canals, and pledging ample funds for that purpose. The bill, after being discussed four weeks, passed the assembly by the decisive vote of ninety-one to eighteen. Those who voted in the affirmative, were Aaron Adams, Truman Adams, Joshua Ballard, Asa C. Barney, Joseph Bayley, John H. Beach, William C. Bouck, Isaac Brayton, Philip Brasher, John Brown junior, Thomas Brown, Oliver Brown, William Campbell, Israel Chapin, Jonathan Childs, Nathan Christie, Abel Cole, George Cramer, Silas Crippen, David Dill, William A. Duer, Henry Fellows, William D. Ford, Michael Freligh, James Ganson, Isaac Gere, Job Greene, David E. Gregory, George Hall, Nathan Hall junior, Nicoll Halsey, William Hamilton, Michael Harris, Isaac Hayes, Nathaniel P. Hill, Peter A. Hilton, Henry Hopkins, Eliphalet S. Jackson,

* Colden's Memoir.

Peter A. Jay, Oliver Judd, Alexander Kelsey, Nathan Kimball, Herman Knickerbacker, Edward W. Laight, Jacob L. Larzelere, Thomas Lawyer, Henry Leavenworth, Henry B. Lee, Henry Livingston, James Lynch, Samuel I. McChestney, John McFadden, Arunah Metcalf, Elijah Miles, Green Miller, Samuel Milliman, Benjamin Mooers, Andrew Morris, Roderick Morrison, Thomas J. Oakley, Elias Osborn, John I. Ostrander, James Palmer, William Parks, Timothy H. Porter, James Powers, Edmund G. Rawson, John Reid, Jacob Roggen, Abraham Rose, David Russell, Reuben Sanford, John Schoolcraft, Barnabas Smith, Jesse Smith, Joseph Smith, Roger Sprague, James Stevenson, Selah Strong, Thomas C. Taylor, William Thompson, Jacob R. Van Rensselaer, George Warner, Elizur Webster, Dirck Westbrook, Roswell Weston, John Whiting, Mason Whiting, Nathan Williams, Isaac Wilson and Augustus Wyncoop. Those who voted in the negative were Gamaliel H. Barstow, James Burt, Phineas Carl, Stephen Carman, Richard Cowson, Chillus Doty, Zechariah Hoffman, Benjamin Isaacs, William Jones, Daniel Kissam, Abraham Miller, William Munroe, William Requa, Amos Stebbins, Richard Van Horne, Harmanus A. Van Slyck, John B. Van Wyck, William Woodward.

When the bill reached the senate, Martin Van Buren proposed an amendment which would limit the powers of the commissioners to the consideration and adoption of measures requisite to facilitate the preparations for constructing the canals, the employment of engineers to explore and examine the routes; to making application to sister states and territories for aid, and to proprietors of land, corporations and citizens, for grants of land, or donations of money; and to general inquiries concerning finances. This amendment prevailed, by a vote of twenty to nine, and the bill passed the senate, after being further amended so as to constitute Stephen Van Rensselaer, De Witt Clinton, Samuel Young, Joseph Ellicott and Myron Holley commissioners, and to appropriate twenty thousand dollars for the purposes contemplated. As thus amended, the bill received the votes of David Allen, Russel Atwater, Jacob Barker, Stephen Bates, Bennet Bicknell, Francis A. Bloodgood, Moses I. Cantine, Archibald S. Clark, Lucas

Elmendorf, Chauncey Loomis, Peter H. Radcliff, William Ross, Henry Seymour, Samuel Stewart, Philetus Swift, Martin Van Buren, Abraham Van Vechten, Samuel Verbryck and Gerrit Wendell. Those who voted against the bill were James Cochran, Darius Crosby, Jonathan Dayton, Parley Keyes, Peter R. Livingston and David Ogden. The bill received the concurrence of the assembly, and became a law, after an ineffectual effort to induce the senate to recede from their amendments.

The commissioners selected De Witt Clinton to be their president, and appointed Samuel Young their secretary, and Myron Holley their treasurer; divided the canal route into three sections, middle, eastern and western, and appointed engineers for each section. In 1817 they made a detailed report of the survey. They estimated the cost of the Erie canal at four million five hundred and seventy-one thousand eight hundred and thirteen dollars, and showed that its entire length would be three hundred and fifty-three miles; that the surface of Lake Erie was five hundred and sixty-four feet higher than the Hudson, and one hundred and forty-five feet higher than Rome; and that the aggregate rise and fall would be six hundred and sixty-one feet, which would require the construction of seventy-seven locks. The dimensions of the canal, as established, were forty feet width at the surface, twenty-eight feet at the bottom, and four feet depth.

The commissioners, although they spoke discouragingly, did not yet relinquish the hope of aid from the federal government, and from sister states; and they recorded the enlightened and generous resolution of Ohio, to aid as far as her resources would justify, in the construction of a work, the advantages of which to herself and to the union she so clearly discerned. The commissioners further reported, that although they had not accurate information, they had no doubt that loans of money sufficient for the construction of the work could be obtained, and that ample funds could be commanded for the payment of interest and the extinguishment of the debt, without taxation.

The commissioners, at the same session, submitted a further report, showing that the estimated cost of the Champlain canal was eight hundred and seventy-one thousand dollars, and recommending its immediate construction. The joint legislative committee on the canals consisted of Peter R. Livingston, George Tibbits and Philetus Swift, of the senate; and William D. Ford, Nathaniel Pendleton, Jonathan Child, Henry Eckford and Gideon Wilcoxson, of the assembly. Mr. Ford made an elaborate report in favor of the immediate commencement and vigorous prosecution of both works; submitted a scheme of finance, which formed the basis of the plan ultimately adopted, and brought in a bill entitled "An act concerning navigable communications between the great western and northern lakes and the Atlantic ocean." This bill, which, after a very full discussion in both houses, became a law, provided for an immediate commencement of the canals; and thus, after a struggle of ten years, the ascendancy of the policy of internal improvement was complete.

The sentiments of mingled hope and apprehension on the part of the legislature, in finally adopting that policy, were thus expressed in the preamble to the law: "Whereas, navigable communications between Lakes Erie and Champlain, and the Atlantic ocean, by means of canals connected with the Hudson river, will promote agriculture, manufactures and commerce, mitigate the calamities of war, and enhance the blessings of peace, consolidate the union, and advance the prosperity and elevate the character of the United States: And whereas, it is the incumbent duty of the people of this state, to avail themselves of the means which the Almighty has placed in their hands for the production of such signal, extensive and lasting benefits to the human race: Now, therefore, in full confidence that the congress of the United States, and the states equally interested with this state in the commencement, prosecution and completion of those important works, will contribute their full proportion to the expense; and in order that adequate funds may be provided, and properly arranged and managed, for the prosecution and completion of all the navigable communications contemplated by this act." The act constituted a canal fund to consist of such appropriatons,

grants and donations, as might be made by the legislature, by the federal government, by states, and by corporations, companies and individuals, and placed it under the management of a board of commissioners of the canal fund, "to be composed of the lieutenant-governor, comptroller, secretary of state, attorney-general, surveyor-general and treasurer." The board was authorized to borrow moneys on the public credit, at an interest not exceeding six per centum, and not exceeding in one year a sum which, together with the income of the fund, should amount to four hundred thousand dollars. For the moneys to be borrowed, the comptroller was to issue transferable stock. Stephen Van Rensselaer, De Witt Clinton, Samuel Young, Joseph Ellicott, and Myron Holley, were reäppointed commissioners, under the denomination of canal commissioners. The comptroller was directed to pay to them the moneys to be borrowed, and the income of the canal fund, reserving always sufficient to pay the interest on loans. The canal commissioners were empowered to establish and collect reasonable tolls whenever any portion of the work should be completed. The fee simple of the canals was to be vested in the people, provision being made to indemnify the proprietors of lands. The commissioners were also to take measures for vesting in the people the title of the property of the Western Inland Lock Navigation Company, paying that association for the same out of the canal fund. A duty of twelve and a half cents per bushel on all salt to be manufactured in the then western district of the state, a tax on steamboat passengers, the unappropriated proceeds of all lotteries, the nett proceeds from the property and tolls of the Western Inland Lock Navigation Company, the nett revenues of the canals, all grants and donations, and all duties upon sales at auction — after deducting existing appropriations of thirty-three thousand five hundred dollars — were pledged for the prosecution of the works and the payment of the interest, and the final redemption of the stock to be issued for that purpose.

It is scarcely necessary to remark, that the growing power and influence of the western and northern portions of the state were chiefly effective in securing the commencement of the canals. The representatives from other regions in

yielding the acknowledgment of that influence, still entertained so much distrust of the productiveness of the works, that they insisted upon incorporating in the law a provision for levying a tax of $250,000 upon the lands lying along the routes of the canals, and within a distance of twenty-five miles on each side thereof. This provision undoubtedly affected the votes upon the passage of the law. In the assembly sixty-four members voted for, and thirty-six against it. Those in the affirmative were, Henry Albert, David I. Ambler, Isaac Barber, Wheeler Barnes, John H. Beach, Abijah Beckwith, John Brown junior, John H. Burhans, Abram Camp, William Campbell, Daniel Carpenter, Jonathan Childs, Gerret Cuck, Rowland Day, John D. Dickinson, William A. Duer, Tunis B. Eldridge, James Faulkner, James Finch, Henry Fonda, William D. Ford, James Ganson, Archer Green, Henry Gross, Burton Hammond, Elihu Hedges, Peter A. Hilton, James Houghtaling, Hezekiah Hulburt, Samuel Jackson, Jacob L. Larzelere, Joshua Lee, Newton Marsh, Moses Maynard, Greene Miller, John Miller, Benjamin Mooers, Zebulon Mott, Cyrenus Noble, Jonathan Olmsted, John I. Ostrander, Humphrey Palmer, Nathaniel Pendleton, Nathaniel Pitcher, John Pixley, Henry Platt, Timothy H. Porter, Jedediah Prendergast, William B. Rochester, James Roseburgh, George Rosenkrantz, Isaac Sears, Richard Smith, Gideon Tabor, Elijah Turner, Ebenezer Wakeley, Ebenezer W. Walbridge, Rufus Watson, James Webb, Asa Wells, Gideon Wilcoxson, Elisha Williams, Isaac Wilson and David Woods. Those who voted in the negative were, Cornelius A. Blauvelt, Levi Callender, Stephen Carman, William Cook, Richard C. Corson, Clarkson Crolius, Chillus Doty, James Emott, John Gale, Cornelius Heeny, William Jones, Martin Keeler, Daniel Kissam, John McFadden, Asa Mann, Elijah Miles, Abraham Parsons, John Pettit, Samuel B. Romaine, Samuel Russell, Reuben Sanford, Isaac Sargent, Edward Smith junior, Joseph Smith, Samuel A. Smith, Justus Squire, Amos Stebbins, Christopher Tappen junior, John Townsend, John Victory, George Warner, Elizur Webster, Ebenezer White junior and Ebenezer Wood.

In the senate the vote on the law was eighteen to nine. In the affirmative

were, David Allen, Stephen Bates, Bennet Bicknell, Moses I. Cantine, James Cochran, Ralph Hascall, Ephraim Hart, Parley Keyes, John Knox, William Mallory, John I. Prendergast, William Ross, Farrand Stranahan, Samuel Stewart, Peter Swart, George Tibbits, Martin Van Buren and Abraham Van Vechten; and in the negative, Henry Bloom, Walter Bowne, Darius Crosby, Jonathan Dayton, John D. Ditmis, Lucas Elmendorf, Peter R. Livingston, John Noyes and Isaac Ogden.

The geographical classification of members voting for and against the law was as follows:

IN THE SENATE.

	Affirmative.	Negative.
Southern district,		5
Middle "	6	3
Eastern district,	7	
Western "	5	1
	18	9

IN THE ASSEMBLY.

Suffolk,		1
Queens,		3
Richmond,		1
New-York,		7
Westchester,		3
Rockland,		1
Putnam,		1
Dutchess,	2	2
Orange,	3	1
Ulster and Sullivan,	1	1
Greene,		2
Columbia,	4	
Rensselaer,	5	
Albany,	4	
Washington and Warren,	2	3
Saratoga,	1	1
Essex,		1
Clinton and Franklin,	1	
St. Lawrence,		
Schenectady,		1
Schoharie,	2	
Montgomery,	4	
Herkimer,	3	
Lewis and Jefferson,		3
Otsego,	5	
Chenango, Broome and Tioga,	2	1
Madison,	3	
Oneida,	4	
Onondaga,	3	1
Cortland,	1	
Cayuga,	3	1
Seneca,	2	
Ontario,	3	
Genesee,	2	1
Steuben and Allegany,	2	
Niagara, Cattaraugus and Chautauque,	2	
	64	36

The ground was broken, for the construction of the Erie canal, on the fourth day of July, 1817, at Rome, with ceremonies marking the public estimation of that great event. De Witt Clinton, having just before been elected to the chief magistracy of the state, and being president of the board of canal commissioners, enjoyed the high satisfaction of attending, with his associates, on the auspicious occasion.

In his annual speech to the legislature in 1818, he congratulated the people on the commencement of the canals, rapidly reviewed the progress already made in their construction, remarked briefly on their advantages, and earnestly urged that the state was required to persevere, by every dictate of interest, by every sentiment of honor, by every injunction of patriotism, and by every consideration which ought to influence the councils and govern the conduct of a free, high-minded, enlightened and magnanimous people. The senate responded favorably to these sentiments, and the answer of the assembly was in terms of spirited congratulation.

The commissioners made a report, showing that they had engaged Isaac Briggs, an eminent mathematician, as an engineer on the middle section, and had let the work to be done in small portions, by contract.

At this session, laws were passed, authorizing the construction of the Chittenango canal for navigation, and as a feeder to the Erie canal; and an examination of the outlet of Buffalo creek, with a view to form a harbor at the entrance of the Erie canal into Lake Erie, and making improvements of the financial system adopted at the previous session. The act relating to the last mentioned subject, authorized the comptroller to borrow one million of dollars for the general uses of the treasury, and to issue therefor stock redeemable on the first of January, 1828. When this law was under consideration in the assembly, Erastus Root moved that the power of the commissioners of the canal fund to borrow money for canal purposes, should be suspended until the redemption of the stock debt to be created under the law. This was the last effort made in the legislature to

arrest the prosecution of the canals. The motion was lost, only twenty-one members voting therefor.

In 1819, governor Clinton announced to the legislature, that the progress of the public works equalled the most sanguine expectations, and that the canal fund was flourishing. He recommended the prosecution of the entire Erie canal. Enlarging upon the benefits of internal navigation, he remarked, that he looked to a time not far distant, when the state would be able to improve the navigation of the Susquehannah, the Allegany, the Genesee and the St. Lawrence; to assist in connecting the waters of the great lakes and the Mississippi; to form a junction between the Erie canal and Lake Ontario through the Oswego river; and to promote the laudable intention of Pennsylvania to unite the Seneca lake with the Susquehannah; deducing arguments in favor of such enterprises, from the immediate commercial advantages of extended navigation, as well as from its tendency to improve the condition of society, and strengthen the bonds of the union. Henry Yates junior, in the senate, and John Van Ness Yates, in the assembly, on behalf of the proper committees, submitted answers concurring in the opinions expressed by the chief magistrate, and the same were adopted.

Joseph Ellicott, having resigned the office of canal commissioner, Ephraim Hart was appointed in his place, ad interim, and subsequently Henry Seymour was called to fill the vacancy.

The canal commissioners, in their report, gave an interesting account of their proceedings, represented that the work on the middle section, under the care of Benjamin Wright as principal engineer, had been conducted with great success; and that Canvass White and Nathan S. Roberts, who had previously bee nassistant engineers, were assigned, on account of their eminent skill, to higher duties. Mr. White was distinguished at this time for his discovery of the manner of preparing a hydraulic cement from a peculiar species of limestone found in the vicinity of the canal. He was the inventor, also, of the improvement in the construction of upper gates of canal locks, which has been said to be the only im-

provement in the mechanical construction of canals, made since the building of the Languedoc canal.

The commissioners recommended that a navigable communication should immediately be opened from the Erie canal to the salt works at Salina, and that the militia law should be so modified as to excuse laborers on the canals from military duty, and sustained the recommendation by the governor of the simultaneous prosecution of all portions of the Erie canal.

The joint committee on internal improvements consisted of Jabez D. Hammond, Henry Seymour and Walter Bowne, senators, and Ezekiel Bacon, Jacob Rutsen Van Rensselaer, John Doty, Jedediah Miller and Asahel Warner, of the assembly. Mr. Bacon submitted a report, and introduced a bill, embodying the recommendations of the canal commissioners. This bill became a law, twenty-five members of the assembly voting against the section which empowered the canal commissioners to commence the eastern and western portions of the Erie canal and the branch canal from the Erie canal to Salina. A survey was also authorized from the mouth of the Oswego river, up the same, the Seneca river and the outlet of the Onondaga river, with a view to improve the navigation of those streams. This was the first legislative step towards the construction of the Oswego canal.

At this session a law was passed, suspending the collection of the local canal tax, until further directions should be given by the legislature.

An act was also passed, granting a loan to citizens of Buffalo, to be applied to the construction, under the direction of the canal commissioners, of a harbor at that place, and providing for the assumption of the harbor, if it should ultimately be deemed expedient.

On the twenty-third of October, 1819, the portion of the Erie canal between Utica and Rome was opened to navigation, and on the twenty-fourth of November the Champlain canal admitted the passage of boats. Thus in less than two years and five months one hundred and twenty miles of artificial navigation had been finished, and the physical as well as the financial practicability of uniting

the waters of the western and northern lakes with the Atlantic ocean, was established to the conviction of the most incredulous.

Governor Clinton announced these gratifying results to the legislature in 1820, and admonished them that while efforts directly hostile to internal improvements would in future be feeble, it became a duty to guard against insidious enmity; and that in proportion as the Erie canal advanced towards completion, would be the ease of combining a greater mass of population against the further extension of the system. Attempts, he remarked, had already been made to arrest the progress of the Erie canal west of the Seneca river, and he anticipated their renewal when it should reach the Genesee. But the honor and prosperity of the state demanded the completion of the whole of the work, and it would be completed in five years, if the representatives of the people were just to themselves and to posterity. Referring to the local tax, he submitted whether it comported with the magnanimity of government to resort to partial or local impositions to defray the expenses of a magnificent work, identified with the general prosperity. The commissioners informed the legislature that they had employed David Thomas to survey the proposed harbor at Buffalo, and that plans for a similar improvement at Black Rock had been received.

The committee on internal improvements in the senate, consisted of Jabez D. Hammond, Gideon Granger and Stephen Barnum; and the committee on canals in the assembly, of George Huntington, John T. Irving, David Austin, Elial T. Foote and Thomas J. Oakley.

A law was passed, suspending the collection of the tax on steamboat passengers, and imposing, by way of commutation, on the North River Steamboat Company an annual tax of five thousand dollars, for the benefit of the canal fund. This company then enjoyed, by grant from the legislature, a monopoly of steam navigation upon all the waters within the state, as a reward to Robert Fulton, Robert R. Livingston and their associates, as public benefactors. The grant was afterwards adjudged by the supreme court of the United States to be void, so far as it affected navigation in tide waters, because it conflicted with the

constitution of the United States. The same law appropriated twenty-five thousand dollars for the improvement of the Oswego river; and by other acts, Grand island on the Niagara river, and a portion of the reservation at the Onondaga salt springs, were directed to be sold for the benefit of the canal fund; and the legislature prescribed a general system of police for the management and protection of the canals.

By an arrangement made by the commissioners, and sanctioned by the legislature, three of the five commissioners were charged with active duties, to be compensated by salaries, while the other commissioners were relieved from such duties. The acting commissioners designated were Mr. Young, Mr. Seymour and Mr. Holley. During the same year the title of the Western Inland Lock Navigation Company, to its property and privileges, was transferred to the state, and a compensation of one hundred and fifty thousand eight hundred and twenty-eight dollars was paid for the same.

In November, 1820, governor Clinton congratulated the legislature upon the progress of the public works. He urged the adoption of plenary measures to complete the Erie canal within three years, enforcing the recommendation by the consideration, that Ohio would thereby be encouraged to pursue her noble attempt to unite the waters of Lake Erie with the Ohio river. The canal commissioners showed in their report that the Erie canal was navigable from Utica to the Seneca river, a distance of ninety-six miles, and that its tolls, during four months, had amounted to five thousand two hundred and forty-four dollars.

An effort was made in the assembly to abrogate the local tax, which failed; a result showing that distrust of the productiveness of the canals still lingered in the halls of the legislature. This, however, was the last effort, and the law has been suffered to remain ever since, unexecuted and unrepealed. William C. Bouck was, during the same session, appointed an acting canal commissioner.

Governor Clinton, in 1822, referred, in his speech, to the difficulties and embarrassments which had been encountered with regard to the most eligible routes for the canals, and the most proper designations for the termini of the Erie

canal; assuring the legislature, however, that the canal board had not been led astray by local considerations or ephemeral expedients, and that they would be able to combine the accommodation of flourishing cities and villages with the promotion of the general convenience and welfare. He noticed the efforts on the part of Illinois to connect the river of that name with Lake Michigan, and those of Ohio to unite with Lake Erie the river which formed her southern boundary, commending those efforts to the munificent patronage of the national government, and the favorable countenance of New-York. He recommended also the institution of a board of public improvements, to be composed of enlightened and public spirited citizens, and invested with power to establish and facilitate all useful channels of communication, and all eligible modes of improvement.

The tolls on the portion of the Champlain canal which had been completed, amounted, in the previous year, to one thousand three hundred and eighty-six dollars.

The legislature at this session directed the canal commissioners to open a boat navigation between the village of Salina, the Onondaga lake and the Seneca river. These improvements when completed, together with those previously directed, created an artificial canal from the Erie canal to Lake Ontario, and constituted a portion of what afterwards became known as the Oswego canal.

Acts were also passed to encourage the construction of harbors at Buffalo creek and Black-Rock, and to adapt the Glen's Falls feeder of the Champlain canal to boat navigation.

On the first of January, 1823, the government went into operation under the new constitution, Joseph C. Yates having been elected to the office of governor. The constitution declared that rates of toll not less than those set forth by the canal commissioners, in their report of 1821, should be collected on the canals, and that the revenues then pledged to the canal fund should not be diminished nor diverted before the complete payment of the principal and interest of the entire canal debt, a pledge which placed the public credit on an impregnable basis.

It appeared at the commencement of the session of the legislature in 1823, that the public debt amounted to $5,423,500, of which $4,243,500 were for moneys borrowed to construct the canals. The commissioners reported that boats had passed on the Erie canal a distance of more that two hundred and twenty miles, and that as early as the first of July ensuing, that channel would be navigable from Schenectady to Rochester. The tolls collected in 1822, upon the Erie canal, were $60,000, and upon the Champlain canal, $3,625. The improvements of the outlet of Onondaga lake had been completed, and the Glen's Falls feeder was in a course of rapid construction. Among the benefits already resulting from the Erie canal, the commissioners showed that the price of wheat west of the Seneca river had advanced fifty per cent. To appreciate this result, it is necessary to understand that wheat is the chief staple of New-York, and that far the largest portion of wheat-growing lands in this state lie west of the Seneca river.

Attempts were again made in both branches to provide for collecting the local tax. The proposition was lost in the senate by a vote of nineteen to ten, and in the assembly by a division of sixty-five to thirty-one.

The legislature expressed by resolution a favorable opinion of the inland navigation which New-Jersey proposed to establish between the Delaware and Hudson rivers. A loan of $1,500,000 was authorized for canal purposes; a survey of the Oswego river was directed to be made, and estimates of the expense of completing the canal from Salina to Lake Ontario. An association to construct such a canal was incorporated, and authority given to the commissioners to take the work when completed, leaving the use of its surplus waters to the corporators; and the eastern termination of the Erie canal was fixed at Albany.

The canal commissioners reported in 1824 that the Champlain canal was finished; that both canals had produced revenues during the previous year of one hundred and fifty-three thousand dollars, and that the commissioners had

decided that the Erie canal ought to be united with the Niagara river at Black Rock, and terminate at Buffalo.

Myron Holley now resigned the office of canal commissioner, and laws were passed appropriating one million of dollars for canal purposes, and directing a survey for a canal from Lake Champlain to the St. Lawrence, with a view to complete the inland navigation between that river and the Hudson.

On the twelfth of April, 1824, John Bowman presented to the senate a concurrent resolution, that "De Witt Clinton, Esq. be and he is hereby removed from the office of canal commissioner;" and it was carried on the same day through the senate, by a vote of twenty-one to three, and through the assembly by a vote of sixty-four to thirty-four.

As soon as a partial navigation of the canals had commenced, the government of the United States asserted a pretension to exact tonnage duties thereon. The legislature of this state, at its adjourned session, instructed its senators and representatives in congress to use their utmost endeavors to prevent such unjust and impolitic exactions; and the claim of the government of the United States, although not formally relinquished, has never since been urged.

On the reässembling of the legislature in January, 1825, De Witt Clinton, who, in November of the preceding year, had been again called to the office of chief magistrate, congratulated the legislature upon the prospect of the immediate completion of the Erie canal, and the reasonable certainty that the canal debt might soon be satisfied, without a resort to taxation, without a discontinuance of efforts for similar improvements, and without staying the dispensing hand of government in favor of education, literature, science and productive industry. Earnestly renewing his recommendation that a board of internal improvement should be instituted, he remarked that the field of operations was immense, and the harvest of honor and profit unbounded; and that if the resources of the state should be wisely applied and forcibly directed, all proper demands for important avenues of communication might be satisfied. The primary design of our system of artificial navigation, which was to open a communication between

the Atlantic and the great lakes, was already, he observed, nearly accomplished, but would not be fully realized until Lake Ontario should be connected with the Erie canal and with Lake Champlain; and the importance of these improvements would be appreciated when it was understood that the lake coast, not only of this state, but of the United States, was more extensive than their sea coast. The next leading object, he remarked, should be to unite the minor lakes and secondary rivers with the canals, and to effect such a connection between the bays on the sea coast as would ensure the safety of boat navigation against the tempests of the ocean in time of peace, and against the depredations of an enemy in time of war. He pointed out, as portions of this great system, the construction of canals to connect the Seneca, the Cayuga, the Canandaigua and other lakes in the vicinity, with the Erie canal, and of a navigable channel from the Hudson to the Delaware; an union of the upper waters of the Susquehannah with the Genesee and the Allegany rivers; a connection of the Erie canal with the Susquehannah river, through the Chenango valley; of the same river with the Seneca lake; of the Erie canal at Buffalo with the Allegany river, at the confluence of that stream with the Conewango, and of the Black river with the Erie canal; and the construction of a navigable communication between Gravesend bay and other inlets of the sea, on the shore of Long Island. To these suggestions he added others, concerning the importance of an uninterrupted navigation of the upper waters of the Hudson river, and a road through the southern tier of counties from tide water to Lake Erie.

Of this comprehensive plan, the Oswego canal, the Cayuga and Seneca canal, the Crooked Lake canal, the Chemung canal, the Chenango canal, and the Delaware and Hudson canal, are already completed; the Black River canal, the Genesee Valley canal, the New-York and Erie railroad, and the Long Island railroad, are now in process of construction; while for the Ogdensburgh and Lake Champlain railroad, the Connewango canal, the improvement of the northern branches of the Hudson, and the projected continuation of the Chemung and Chenango canals, surveys have been made under legislative authority.

Railroads, recently adopted in Europe for general purposes of transportation, were at that time unknown on this side of the Atlantic; but the system of internal improvement marked out by Clinton, has been found eminently practicable with the application of that invention.

The public debt for the canals in 1825, amounted to seven and a half millions of dollars, (all of which, it must be recorded to the honor of the state and the country, had been borrowed of American capitalists,) and the annual interest thereon to three hundred and seventy-six thousand dollars. The governor estimated, that the tolls for the year would exceed three hundred and ten thousand dollars; that the duties on salt would amount to one hundred thousand dollars, and that these, with the other income of the canal fund, would produce a revenue exceeding by three hundred thousand dollars, the interest on the canal debt. He stated also, that ten thousand boats had passed the junction of the canals near tide water during the previous season. Remarking that the creative power of internal improvement was manifested in the flourishing villages which had sprung up or been extended; in the increase of towns, and above all in the prosperity of the city of New-York; and noticing the fact, that three thousand buildings had been erected in that city during the preceding year, Clinton predicted that in fifteen years its population would be doubled, and that in thirty years that metropolis would be the third city in the civilized world, and the second, if not the first, in commerce.

Adverting to the efforts which Ohio was making to connect Lake Erie, which, he remarked, might now be regarded as a prolongation of the Erie canal, with the Ohio river, he declared, that he should welcome the commencement and hail the consummation of that work as among the most auspicious events in our history; and closed his review of the condition and prospects of the state, with the exclamation: "How emphatically does it behove us, in the contemplation and enjoyment of these abundant blessings, to remember that we derive them all from the great fountain of benevolence!"

The canal commissioners alluding to the pressure of business on the eastern

section of the canal, and the probability of its rapid increase, announced to the legislature that it would be necessary before long to exclude passenger boats from this part of the line, unless double locks were made through the whole distance, and remarked that even then the crowd of boats in the spring and fall would produce great inconvenience and delay. Reasoning that in many places it would be almost impossible to construct double locks, and that in others it would be attended with great expense, they inferred that in a very few years it would be proper and perhaps indispensable to make a parallel canal along the valley of the Mohawk. They showed, that in 1820 the tolls on ninety-four miles of the Erie canal were $5,000; in 1821, on the same distance, $23,000; in 1822, on one hundred and sixteen miles, $57,000; in 1823, on one hundred and sixty miles, $105,000; and in 1824, on two hundred and eighty miles, had reached the sum of $294,000. They submitted tables, in which they estimated the tolls on a basis of the increase of population, and the progress of agricultural improvement, and predicted that in 1836 two millions of people would be within the influence of the Erie canal; that its tolls would in that year reach the sum of one million of dollars; and that, if the rates should not be reduced, they would amount in 1846, to two millions of dollars, and in 1856, to four millions.

At this session, Samuel Dexter junior introduced a bill into the assembly for exploring a route to connect the waters of the Black river with the Erie canal; Jacob Adrian Van Der Heuvel brought in a bill to construct a canal from Potsdam, in St. Lawrence, to the Oswegatchie, and to improve the navigation of that river; and Thurlow Weed proposed a survey with a view to connect the Allegany river at Olean with the Erie canal at Rochester, by a navigable communication through the valley of the Genesee river. Laws were passed at the same session, authorizing the construction of the Cayuga and Seneca canal, adopting the Oswego canal as a state work, and providing for surveys for most of the other improvements recommended by the governor; and the legislature, in view of the approaching completion of the main arteries of the system of inland navigation, directed that all the laws, reports and documents relative to the canals, requisite

for a complete official history of these works, with necessary maps and profiles, should be carefully collected and published. This duty was performed with much accuracy by a legislative committee, with the assistance of John Van Ness Yates, then secretary of state, who had been one of the most constant and efficient friends of the policy, of whose history he thus became the guardian.

On the 26th of October, 1825, the Erie canal was in a navigable condition throughout its entire length, affording an uninterrupted passage from Lake Erie to tide water in the Hudson. Thus in eight years artificial communications four hundred and twenty-eight miles in length, had been opened between the more important inland waters, and the commercial emporium of the state. This auspicious consummation was celebrated by a telegraphic discharge of cannon, commencing at Lake Erie, and continued along the banks of the canal and of the Hudson, announcing to the city of New-York, the entrance on the bosom of the canal of the first barge that was to arrive at the commercial emporium from the American Mediterraneans. Borne in this barge, De Witt Clinton and his coadjutors enjoyed the spectacle of a free people rejoicing in the assurances of prosperity increased, and national harmony confirmed; and were hailed, in their passage, through towns and cities they might almost be said to have called into existence, with the language of irrepressible gratitude and affection.

The governor, suppressing all feelings of self-gratulation, announced these events to the legislature of 1826, as evidences of the ability, as well as the disposition of republican governments to promote the welfare of mankind. He congratulated the representatives of the people that the spirit of internal improvement continued in full power here, and had diffused itself into other states. He announcdd that the Oswego canal, and the Cayuga and Seneca canal, had been diligently prosecuted; the proposed canal between the Hudson and Delaware rivers, a work encountering formidable physical difficulties, was in successful progress, under the care of an incorporation which sought a trade with the coal districts of Pennsylvania, and that commissioners, appointed at a previous session, were surveying a road from Lake Erie to the Hudson, and works scarcely

less intimately connected with the prosperity of this state and the success of her system of improvements were in process of construction by the state of Ohio.

The whole cost of the Erie and Champlain canals was stated at $9,130,000; the canal debt at $7,738,000, and its annual interest at $413,000. The canal commissioners reported that the tolls, during the preceding year, were $566,221; and they estimated them for the current year at $750,000, which, with the other revenues of the canal fund, would make the sum of $1,100,000, and after paying all expenses and interest, leave applicable to the reduction of the principal, $575,000.

The year 1826 was distinguished by the commencement of the railroad policy in the state of New-York. Stephen Van Rensselaer and others were incorporated with power to construct a railroad from Albany to Schenectady, and the right to enjoy, for fifty years, the profits of the enterprise; but the state reserving the right to assume the road on paying to the company the excess of the cost, with interest thereon, over the profits of the work. This important feature has been incorporated in all the charters since granted for the construction of railroads, and circumstances are now occurring which indicate its importance.

The legislature in 1827, was occupied, so far as internal improvements were concerned, with the policy of aiding the Delaware and Hudson Canal Company; with discussing the most eligible route for a connection between the Erie canal and the Susquehannah river, and with considering the merits of the projected state road through the southern counties. Then, and during several successive years, the general policy of internal improvement being scarcely questioned, the public mind was engaged rather with the comparative merits of various projects, than in digesting and perfecting a system.

In 1835, the debt of the state, incurred in the construction of the Erie and Champlain canals, had virtually been paid. Moneys derived from the revenues of the canal fund, equal to the canal debt, had accumulated and been invested for the security of the public creditors; and the revenues arising from salt and auction duties were now, by an amendment of the constitution, diverted to the

general purposes of the treasury; and the state was, therefore, in the full enjoyment of those revenues, as well as such as were derived from the canals.

It was now found that the locks and other mechanical structures on the Erie canal, were worn by time and use; inconveniences were experienced in consequence of its limited dimensions and inadequate lockage; and notwithstanding its eminent productiveness, it had failed to accomplish fully the objects of its construction, inasmuch as a considerable amount of western trade continued to seek markets by other routes. It was obvious, moreover, that the capacity of that channel should be increased to reduce the expenses of transportation. The legislature, therefore, directed that an enlargement should be undertaken whenever the canal board should be of opinion that the public interest required such an improvement; and it was referred to the discretion of the board to fix the dimensions of the new channel. The canal board adopted the dimensions of seventy feet width and seven feet depth, with double locks. The act of 1835 limited, however, the expenditures for the enlargement, to the annual surplus of the canal tolls, which, after 1837, was to be annually diminished by a considerable sum, to be devoted to the uses of the treasury. In 1836, the legislature directed the long contemplated construction of the Genesee Valley canal and of the Black River canal; and during this year those improvements were commenced, and the enlargement of the Erie canal was prosecuted. A loan of the public credit, to the amount of three millions of dollars, was, at the same session, made to a company which had been incorporated in 1832, for the construction of a railroad between the Hudson river and Lake Erie, through the southern range of counties.

The canal commissioners, in 1837, reported the progress which had been made in the construction of the Genesee Valley and Black River canals, and the enlargement of the Erie canal, and recommended the more speedy prosecution of the latter work.

In 1838, the governor, William L. Marcy, announced that the canal commissioners were devoting to the enlargement of the Erie canal, all the means placed within their control; that no new contracts, however, had been entered into

during the preceding year, and that some failures and delays had occurred with respect to those previously made. He remarked, that the best interests of the state appealed with great earnestness for the early completion of that important improvement, and he was persuaded that a larger sum than the existing appropriation might be advantageously expended without causing an interruption or delays in navigation. Adverting also to the advantages of the canal as a channel for western trade, he declared that both duty and interest indicated the propriety not only of making it adequate to the public wants, but of doing so at the earliest practicable period.

Stephen Van Rensselaer, William C. Bouck, Jonas Earll junior, John Bowman and William Baker were then canal commissioners. They urged the vigorous prosecution of the enlargement as a measure of enlightened economy and foresight. But apprehensions were found in the legislature, that the policy recommended could not be pursued without committing too deeply the credit of the state. Although the feasibility of the New-York and Erie railroad had been demonstrated, yet that important enterprise had not sufficiently gained the confidence of the community, to secure subscriptions and payments upon its capital stock, sufficient for its prosecution, without a modification of the conditions upon which the company then enjoyed a loan of public credit. To some extent that enterprise was regarded as one of local character, and it therefore found little favor in remote regions of the state. The enlargement of the Erie canal assumed a similar aspect, in the view of those who desired the former improvement. A general suspension of specie payments, by banking institutions throughout the union, had occurred in 1837; and a commercial revulsion unprecedented in the history of the country, and the effects of which have not yet entirely passed away, was paralyzing the energies of men in every department of industry and enterprise. Under these circumstances all questions before the legislature, in relation to the public works, were merged in the important consideration of the financial ability of the state. The comptroller, Azariah C. Flagg, in his annual report, examined the resources and condition of the treasury, and earnestly recommended a system of finance, of which taxation should be a part, the adoption

of which would, in his opinion, ensure the prompt payment of the interest, and the ultimate redemption of the principal of the public debt.

Samuel B. Ruggles, chairman of the committee on ways and means of the assembly, submitted a report, in which he examined the condition of the finances, and reviewed the progress of internal improvements. In this paper he showed that, on the first of July, 1836, the revenues of the canal fund had accumulated to a sum sufficient to pay the canal debt; which incident it was declared ought to be regarded as the crowning event in the canal policy of the state, and as fixing an important era in its history. He further showed that when the canals were commenced, the state possessed productive property valued at $2,740,000, yielding a revenue of $419,900; a school fund of $982,000; and a literature fund of $26,000: that when the canals were commenced, the nett income of the treasury was reduced to $180,000 annually, by the diversion of the salt and auction revenues to the canal fund: that a tax which had previously been laid to defray the expenses of the late war, was then continued: that in 1826, the rapid increase of the canal tolls began to exhibit itself, and the state tax was discontinued, on the ground that the balance remaining of the general fund, $2,740,000, would sustain the government, until the debt, for which the salt and auction duties, and canal tolls were pledged, should be extinguished; and that those revenues would then be liberated and placed at the service of the state: that by the exhaustion of the general fund, in defraying the ordinary expenses of the government, and by loans for the same purpose, the sum of $3,156,000 had been expended; but that the salt and auction duties, which had been received between the years 1817 and 1836, and paid to the public creditors, amounted to upwards of $5,000,000; that those duties, to the amount of $5,000,000, were virtually invested in the canals as a substitute for the $3,156,000 expended during the same period for the ordinary purposes of government: and that the state, since the year 1825, had created a debt, then yet outstanding, for the construction of lateral canals, amounting to $3,555,000. He further showed that, in the twenty years since the commencement of the canals in 1817, the productive property of

the state had increased from $2,973,617 to $22,157,742, or, after deducting the then existing state debt, to $17,624,986; that the annual revenue had increased from $419,907 to $1,413,846: that during the same period, $500,000 had been expended upon public buildings, the school and literature funds had been doubled, the state tax discontinued, and the people relieved from burthen or expense in supporting the government: that after applying $400,000 of the canal tolls annually to the support of the government, there would remain, applicable to purposes of internal improvement, an annual nett revenue of $787,103; that that sum alone would pay the annual interest on $15,643,000: that any augmentation in the revenue of the canals would increase the financial ability of the state: that every $500,000 of revenue would serve as a basis of finance to sustain $10,000,000 of debt: and that, assuming the opinions of the canal commissioners expressed in their report of that year, that the canals soon after the completion of the enlargement would yield tolls to the amount of $3,000,000 per annum, the sum of thirty millions of dollars might be borrowed, expended, and finally reimbursed within twenty years; or the sum of forty millions might be so borrowed, expended, and reimbursed within twenty-eight years. This view of the financial ability of the state was illustrated by estimates of the tolls and nett revenue of the canals during a series of years, based upon the experience of the increase since their completion. In this table it was assumed that the nett revenues from the canals for 1838 would be $800,000; that it would increase at the rate of $100,000 per annum, until 1842; that after that time, owing to the completion of the enlargement, and other works of internal improvement, and the increase of commerce, until 1845, it would increase at the rate of $200,000 per annum; and from 1845, until 1849, at the rate of $300,000 per annum; at which time the nett revenue would reach the sum of $3,000,000.

The sources from which this large accession of revenue was to be anticipated, were pointed out as existing in the extensive and rapidly increasing communities growing up around the western lakes. The surprising progress already made by that interior group of states, in population, wealth and productive power, was

shown, and the pecuniary results to be realized from their further and necessary increase, were also predicted. The comparative advantages of the enlarged Erie canal, as an outlet for the trade of those interior communities, to the Atlantic, over its present course down the Mississippi to the gulf of Mexico, were also dwelt upon; and the importance of completing that work with all practicable despatch, was earnestly urged upon the legislature. The important commercial effects to be produced by completing the different lines and systems of artificial communication then in progress through those inland states, were also adverted to, together with the fiscal and political advantages to be derived by this state in procuring the transit through its territory for all time to come, of the immense trade of this vast interior region.

In accordance with the conclusions of this report, a law was passed in 1838, appropriating four millions of dollars for the prosecution of the enlargement of the Erie canal. Laws were also passed at the same session, loaning the credit of the state to the Catskill and Canajoharie, the Auburn and Syracuse, and the Ithaca and Owego railroad companies, to the extent of eight hundred thousand dollars, and modifying the loan to the New-York and Erie Railroad Company.

An obvious propriety requires, that the writer of these notes should pass without comment, over the period that remains to be filled up with the progress of internal improvement. Samuel B. Ruggles was appointed canal commissioner in 1839, to fill the place rendered vacant by the widely lamented death of the venerated Stephen Van Rensselaer. In 1840, Asa Whitney, Simon Newton Dexter, David Hudson, George H. Boughton and Henry Hamilton, became canal commissioners. The present board consists of Jonas Earll junior, James Hooker, George W. Little, Benjamin Enos, Stephen Clark and Daniel P. Bissell. In 1840, the conditions of the loan to the New-York and Erie Railroad Company were further modified, and appropriations were made to carry on the construction of the canals; and during the three years, from 1839 to 1842, all those works were vigorously prosecuted.

The tolls on all the canals in this state, during the season of navigation in 1841, were $2,034,878, exceeding those of 1840 by $259,831, equal to an increase of fourteen and a half per cent; and those of 1831, by the sum of $811,077, equal to an increase in ten years, of more than sixty-six and one quarter per cent.

The New-York and Erie railroad, four hundred and fifty-one miles in length, is now one-half completed, and may be brought into use in 1844, if prosecuted with the same energy as heretofore. The enlargement of the Erie canal is one-half finished; nearly all its mechanical structures having been already replaced with works of great strength and durability, and it may be finished within three years, if prosecuted with due diligence. The Auburn and Rochester railroad has been brought into profitable operation; portions of the Long Island railroad, nearly half of the Genesee Valley canal, and the eastern section of the New-York and Erie railroad, have been opened, and are now usefully employed. Our railway communications were extended one hundred and sixty miles within the last year, and their present aggregate length is seven hundred and forty-seven miles; and the total length of our canal navigation is eight hundred and three miles. Meanwhile, enlightened citizens of this state and of Pennsylvania have opened an active and prosperous exchange of gypsum, salt, coal and iron, by the Chemung canal, and by the Ithaca and Owego railroad. There is reason to expect that the continuous line of railroad, now reaching from Albany to Batavia, will be extended to Lake Erie within the year; while the citizens of Albany and Boston have connected our interior thoroughfares with the system of similar works in the eastern states, consisting of one hundred and fifty-two miles of canals, and eight hundred miles of railways; thus opening to us facilities for social intercourse with the people of those prosperous communities, and convenient access to their manufactures, granaries, seaports and fisheries. This important union of the two great northern systems was regarded as marking an era in the progress of internal improvement, so important, and excited so deep an interest, that the governors and legislatures of the states whose combining enterprise had secured the auspicious result, assembled at Springfield, in Massachusetts, a point equi-

distant from their respective capitals, and there exhibited the spectacle, no less sublime than novel, of the governments of two communities, represented by their executive and legislative authorities, uniting in mass to exchange felicitations upon the completion of works which guaranteed domestic tranquillity, ensured their safety from external aggression, and bound their citizens, already allied by common blood and common language, in perpetual bonds of commercial, political and social union.

Agricultural improvement did not engage public attention until after the revolution. An association was instituted in 1791, for the promotion of agriculture, arts and manufactures, and was incorporated in 1793. Among the founders were John Jay, Robert R. Livingston, George Clinton, Samuel L. Mitchill, Ezra L'Hommedieu, Egbert Benson, John McKesson, Samuel Jones, Thomas Tillotson, Aquila Giles, Philip Van Cortland, Edward Livingston, John Thurman, Simeon De Witt, Horatio Gates and Richard Varick. The name of De Witt Clinton appears in the catalogue of 1798. The transactions of the society contain many excellent papers, and exhibit the then condition of agriculture. The society found the art of culture without method. No sufficient means of diffusing proper intelligence existed. Although the publications of the society had a limited circulation, yet they stimulated inquiry. The low condition in which agriculture was found, when these efforts commenced, may be learned from a report to the British board of agriculture, made by William Strickland, in 1794, after extensive travel in this state. "The course of crops," says he, "is as follows: First year, maize or indian corn; second, rye or wheat, succeeded immediately by buckwheat, which stands for seed; third, flax or oats, or a mixed crop; then a repetition of the same thing, as long as the land will bear any thing, after which it is laid by without seed for old field: Or, burn the woods, (that is, clear the land from timber;) then, first, wheat, second, rye, then, maize for four or five years, or as long as it will grow; then, lay it by, and begin on fresh wood land; Or, burn the woods; then wheat four or five years; then one or two of maize, or as long as it will grow; then lay by four or five years for old field,

without seeds. * * * * * * Manure is scarcely made use of, but what little is collected is given to the maize, which requires every support that can be given it. Clover is just beginning to be cultivated, in consequence of which good pasture and plenty of hay take the place of old field, and by the use of gypsum astonishing crops are obtained. The average produce of wheat in New-York has been stated to me, by very intelligent persons, at twelve bushels per acre; which agrees with the general opinion, and I believe is as high as it ought to be stated. The average of Dutchess county, which, under a proper cultivation, would be a most productive as it is a most beautiful county, has been stated at sixteen bushels: twenty bushels per acre are every where a great crop. The average of maize may be about twenty-five bushels; thirty bushels per acre is a great crop. With such agriculture as has been stated, it is not to be wondered at that the produce should be so small, and yet it will be found that the average of this state is superior to that of any other in the union. * * * * * The wheat of New-York is esteemed the best in the United States, and that grown on the banks and branches of the Mohawk, the best in the state."

To this graphic sketch it must be added, that farmers, at the period referred to, were destitute of proper implements of husbandry. The cast iron plough had not been invented; and, not to mention more important instruments, now considered indispensable, the horse hay rake, the threshing machine, the roller and the cultivator, were unknown; or if any of them had been invented, they were so imperfect and so little used as to produce no effect on the general state of agriculture. To understand the progress since made in the art of cultivation, as well as to mark the existing defects in our system, we must consider separately subjects which, when combined, constitute the basis of improved tillage. In all new countries, where the soils abound in the elements of fertility, manure is undervalued. No care is bestowed in preserving and using it, until diminished crops, from an impoverished soil, expose the error which has been committed. Although this error has been somewhat checked in a portion of the state, it still prevails in the newer regions where the natural fertility seems to be inexhaust-

ible. Nevertheless, the contrast in this respect to the picture before presented, is full of encouragement. Barns and yards are now constructed with a view to the accumulation and preservation of manure, and extensive experiments have been made to ascertain the manner in which the greatest possible benefit can be derived from its use. Discrimination prevails in the application of whatever is used for that purpose, to the different species of plants. Indian corn and roots are now cultivated with the immediate application of fresh manures, while the grain crops are cultivated upon grounds previously prepared, by incorporating the nutriment with the soil. Several substances are now extensively used as manure with beneficial results, such as poudrette and peat, and especially gypsum, which, although fifty years ago known to be a stimulant to vegetation, was regarded as operating to exhaust the fertility of the soil. More gypsum is now prepared and sold in the counties of Onondaga and Cayuga alone, than twenty years since was used throughout the whole state. It has been found by experience that the deep ploughing, and complete pulverization, now performed with ease by means of improved instruments, expose the soil more completely to the action of the atmosphere, and furnish a better range or pasture for the roots of plants, and thus operate favorably in regard to both the certainty and abundance of production. The present mode of draining lands already capable of cultivation, is wholly a modern improvement; that process having heretofore been confined to swamps and marshes. The sub-soil plough has been invented with express reference to freeing soils from water and deepening them, without bringing to the surface the sub-soil which is unfit at first for purposes of vegetation. Our agriculturists have also learned that the mechanical mixture of the earths, by effectual ploughing, conduces to fertility. But in no respect has there been a more decided advance in husbandry, than in the attention paid to the rotation of crops. The practice of exhausting land with a succession of similar or varied crops, and then "laying it by for old field," is no longer known. The importance of an alternation of crops with a seeding of grasses, as a part of the rotative system, is universally acknowledged, and has not only been demonstrated by scien-

tific theory, but is now generally approved and adopted; and a system of rotation, in which crops cultivated with the hoe, alternate with the grains, has been recently found an economical substitute for the former process of summer-fallowing. A great advance in farming has been effected by the introduction of root crops into field culture. It is true that the labor of cultivation is expensive, but it is abundantly repaid by increased production, and the superior condition in which the soil is preserved. Our farmers have generally been very negligent in regard to improving the breed of domestic animals. Recently, however, the efforts of a few public spirited persons in introducing cattle, swine and sheep from improved stocks in Europe, have been crowned with high success. The race of horses has been less improved. It is to be hoped that the time has passed when efforts in this important department of agriculture must encounter popular prejudice and ridicule. In England the advance in weight of cattle, sheep and lambs, has averaged at the Smithfield market, as estimated by different individuals, at different times, as follows: In 1810, cattle, twenty-six stone six pounds; 1830, thirty-nine stone four pounds; 1840, forty-six stone twelve pounds: in 1810, sheep and lambs, two stone; 1830, three stone eight pounds; 1840, six stone six pounds. Although it cannot be affirmed that an equal advance has been made here, yet very beneficial effects have resulted as well from the greater care practised in feeding and raising stock, as from the introduction of improved breeds from abroad. The merino blood in sheep has been so extensively diffused since its introduction here in 1809, that it is supposed none of the former race of that animal remains unmixed in the country. Among the animals which have been introduced, are the Short horns, Hereford, Devon and Ayshire cattle; the South down, Leicester and Coteswold sheep; the Berkshire, Irish grazier and Kenilworth swine; and pure bloods or crosses of some of these animals are found in every county, if not in every town in the state. At the present time, thirty-five bushels of wheat per acre is not considered a great crop, and the product frequently reaches forty and even fifty bushels. Seventy-five or eighty bushels of corn per acre is not an extraordinary yield. We cannot speak with

confidence of the increase of root crops; since, with the exception of the potato, all culture of that kind is still in its infancy. It is much to be regretted that provision has not hitherto been made for obtaining statistics concerning the quantity of land under cultivation, and the number of acres devoted to particular crops and their extent; since the information which might have been thus derived would have been not merely useful in ascertaining the present condition of agriculture, but eminently conducive to its future improvement.

The chief step in the improvement of the plough, was the invention by Jethro Wood, which consisted in substituting in the construction of that instrument, cast iron for wood and wrought iron. The new plough thus produced, was more manageable, and more easily drawn; and the apprehensions that its strength would not be found sufficient to resist the power applied to draw it, were ultimately found to be groundless. The utmost skill of mechanism has also been applied in ascertaining the form best adapted to equalize the friction and resistance with the work to be performed. Land is now more perfectly and quickly tilled with the labor of two horses, than with double that power applied to the implement before in use. Moore's plough, for use upon an inclined surface, performs its work with as much ease and completeness as similar labor is performed upon a plain. The threshing machine, a modern invention, has already become indispensable to the farmer. With the horse hay-rake in the meadow, labor is performed equal to that of six men; while as a gleaner of the harvest field, its use annually more than repays its cost. The cultivator has greatly reduced the expense of producing indian corn. Modern improvements of the harrow have diminished the weight of that instrument, and given it greater efficiency in pulverizing the soil. The heavy wrought hoe, and the clumsy three-pronged iron fork, have given place to the steel plate polished hoe, and to the steel fork with four or six tines. We have machines which, with the application of horse power, clear in a perfect manner ten or fifteen acres of grain per day;

and drill-barrows which have reduced the labor and waste of sowing and planting. There has been a marked improvement in the quantity and quality of fruits: Our farmers are not all of them satisfied now as formerly with the apple orchard, but have their fruit gardens, in which, with the arts of grafting, inoculating and transplanting, fine varieties of pears, plums, cherries and other exotic and domestic fruits are produced. The dwellings of our farmers are now, much less frequently than heretofore, constructed as if magnitude was the most important object in their erection. Farm houses may now be found in all parts of the state, combining elegance with comfort and convenience, and refined taste is manifested in the planting and preservation of shade trees. The location and the adaptation of barns and other outbuildings are now especially regarded.

While the society of 1793, gave to agriculture the impulse which has resulted so propitiously, it is now apparent that that institution was defective in omitting to establish fairs, or gatherings, in which farmers and patrons of the art might exchange friendly greetings, and become acquainted with improvements of tillage and implements. In 1819, under the administration of De Witt Clinton, and chiefly in consequence of his recommendations, an act was passed, appropriating ten thousand dollars annually, for four years, to improve agriculture, the arts and manufactures. A board of agriculture was established, and provision was made to induce the organization of societies throughout the state. The anniversaries of these institutions were the farmers' holidays, when lectures and addresses were delivered, and premiums were awarded to those who produced the finest animals, the largest and best crops, the most useful inventions, and superior domestic fabrics; but the societies soon languished and became extinct. The chief fault of the law of 1819 was, that it did not hold out sufficient inducement to voluntary effort. The distribution of the public money was unconditional, and when it ceased, the societies were without funds. Nevertheless, the act of 1819 was followed by very beneficial results. Among these, were the improvement of the breeds of domestic animals, the invention of many useful implements of husbandry, and the introduction of new methods of culture. In 1841, a new

effort was put forth by the legislature. An appropriation was made of eight thousand dollars annually, for five years, to the State Agricultural Society, the American Institute of New-York, and societies in the other counties in the state; on condition, however, that they should respectively devote to the improvement of agriculture, funds, otherwise acquired, equal to the sums contributed from the treasury. The effects of this beneficent law are already seen in the interesting volume containing the transactions of the state agricultural societies for 1841, in the general attention to agricultural science, and in the annual exhibitions and fairs of the state agricultural society, and the several county associations.

Agricultural journals also recently established, have contributed much to the promotion of that important object. Among those in this state which have exerted the most efficient influence, the Ploughboy, by Solomon Southwick, the Cultivator, to which the late Jesse Buel assiduously devoted the energies of his philosophic mind, and the Genesee Farmer, edited for many years by Luther Tucker and Willis Gaylord, and now conducted with equal ability by Henry Coleman, have been eminently successful. These journals have not merely diffused information concerning the processes of agriculture, but they have assigned to the farmer his proper position and just influence in society, and shown him the importance of intellectual acquirement. They have elevated the occupation in popular respect to the dignity of a profession, and it is no longer regarded as one of toilsome service, but as one of true honor, enjoyment and usefulness. Here too, as in Europe, agriculture has advantages from a more intimate connexion with science. To Sir Humphrey Davy belongs the honor of making chemistry subservient to the art. It now seems strange indeed, that while every process in the growth of plants, from their germination to their maturity, is purely the result of chemical action, scarcely an inquiry was bestowed upon the development of that action, until it engaged the attention of that philosopher. Davy was followed by that more profound investigator, Chaptal, and he by Liebig and Johnston. The works of those authors, together with Dana's volume on manures, which is of even greater practical usefulness, have now attained very general

circulation; and though they contain many theories which have yet to undergo the test of more accurate investigation, they have already opened to our citizens a new and most interesting department of science. The district school library has afforded facilities for introducing our farmers, in every school district in the state, to an intimate acquaintance with all that is valuable in these works.

An opinion generally prevails that production is altogether greater in Great Britain than here, in proportion to the quantity of improved land, and to population. The number of improved acres of land in the state of New-York is ten millions; in Great Britain, ninety-eight millions. This state annually produces thirty-nine millions of bushels of wheat, barley, oats and rye. Great Britain produces two hundred and sixty-two millions. New-York produces two millions of cattle, and five millions three hundred and eighty-one thousand sheep. Great Britain produces ten millions of cattle, and forty-four millions of sheep. It thus appears that New-York is more productive in proportion to the quantity of improved land, than Great Britain. The comparison, however, would not hold good if instituted with the strictly agricultural districts of England. The United States produces an average of eighteen and a half bushels of grain for each person, while Great Britain produces in the proportion of twelve bushels for each person. But it must be remembered, that in addition to the grains which have been already mentioned, and which are common to both countries, the United States has a bread crop consisting of four hundred millions of bushels of indian corn, of which the state of New-York produces eleven and a half millions, while Great Britain has no corresponding crop adapted to human sustenance. The United States produces twenty-one millions of swine, a larger number than is to be found in all Europe. Of these, two millions are produced in this state; and this compared with similar productions in Great Britain, increases the proportion of this state in productions adapted to human sustenance. It may be useful to place on record for future reference, as well as to excite attention to the importance of agricultural statistics, an account of the annual productions of the state as derived from

the recent census, which, although not altogether reliable for accuracy, is still the nearest approximation to the truth that can be found.

Bushels of wheat,	12,309,041
" barley,	2,301,041
" oats,	21,896,205
" rye,	2,723,241
" buckwheat,	2,325,911
" indian corn,	11,441,256
" potatoes,	30,617,000
Tons of hay,	3,472,118
" hemp and flax,	1,508
Pounds of silk cocoons,	3,425
" sugar,	11,102,070
Gallons of wine,	5,162
Pounds of wool,	9,845,295
Pounds of hops,	447,250
" beeswax,	52,795
Horses and mules,	474,543
Neat cattle,	1,911,244
Sheep,	5,118,777
Swine,	1,900,065
Value of poultry,	$1,153,413
" dairy products,	$10,496,021
" home-made family goods,	$4,636,547
" productions in market gardens,	$499,126
" nursery and florist produce,	$75,980

If, in a survey of the progress and present condition of agriculture, we find in it many errors of theory to condemn, and many absurd prejudices and practices to be removed, we also find grounds to hope for its continual advancement. It is a science which appeals to us not merely by our desire to increase the public wealth, enlarge the public intelligence, and elevate the standard of public virtue, but as the surest guarantee for the perpetuity of that policy of peace and domestic contentment which is indispensable to the existence of democratic institutions.

Horticulture was practised as a merely useful art from an early period. A great variety of fine fruits and plants was introduced soon after the war of the revolution, by William Prince and James Bloodgood, the proprietors of two of the oldest and most extensive nurseries in the state. Many of our citizens, whom pleasure or business called abroad, sent home rare and valuable varieties of trees and plants. Chancellor Livingston, and other members of the same family, took especial pains to introduce seeds of plants likely to prove desirable here, and the trees thus planted, among which are many fine varieties of cherries and other fruits, may still be seen at the manor garden in Clermont.

The New-York Horticultural Society was founded by a combination of amateurs and practical gardeners, in 1818. The first president was Thomas Storm,

and among its most efficient members were Dr. Hosack, De Witt Clinton, Dr. Mitchill, and Martin Hoffman; and also Messrs. Wilson, Bridgeman and Hogg, who were practical gardeners. Under the fostering care of this society, horticulture acquired a rapid growth. The New-York Farmer and Horticultural Repository, edited by S. Fleet, one of the first gardening newspapers, was an organ of this society.

The Domestic Horticultural Society was established in western New-York in the year 1828. John Greig, of Canandaigua, was its first president; and among its earliest and most valuable members was David Thomas, of Cayuga, before mentioned as an engineer on the Erie canal. Mr. Thomas is a scientific and practical cultivator. A society was established at Newburgh during the same year, and another at Albany in 1829. The late Jesse Buel was the first president of the latter, and although mainly distinguished as an agriculturist, contributed much, both by his writings and by means of a nursery which he established, to promote the increase of horticultural knowledge in the northern and western portions of the state.

At the present time the taste for horticulture is very generally diffused, and particular departments are assigned to the subject in the annual exhibitions of the American Institute in New-York, and the State Agricultural Society. There are five societies devoted to its interests, and no less than twenty commercial gardens or nurseries; the most extensive general nurseries at present in the Union being those of Messrs. Wilcomb & King, (formerly Bloodgood's), at Flushing, L. I., and Messrs. Downing, at Newburgh.

The "Economy of the Kitchen Garden," by William Wilson, the first original work on the subject published in the state, appeared in 1828; and "A Short Treatise on Horticulture," by William Prince, in the same year. Since that time, the "Gardeners' Assistant," by Thomas Bridgeman, has gone through eight editions. "A Treatise on the Vine," published in 1830, and the "Pomological Manual," in 1831, by William R. Prince, have been among the most useful and interesting works published in the country. Mr. Loudon's valuable gardening

works have had considerable influence in diffusing horticultural knowledge, in the absence of native treatises better adapted to our climate; and the gardening works of English authors still have a large circulation in the state. Nevertheless, horticulture, as an art of design, has received very sparing attention. Fine foreign trees and plants have been cultivated in many places with success, but examples of elegant arrangement haver arely occurred. The late M. A. Parmentier, of Brooklyn, Long Island, who emigrated from Holland and established a botanical nursery, (since destroyed,) first attempted to introduce the natural style of laying out grounds. One of the best specimens of his taste is the seat of the late Dr. Hosack, at Hyde Park, on the Hudson.*

During the past year a desideratum in horticulture has been supplied by "A Treatise on Landscape Gardening," with a view to the improvement of country residences, by A. J. Downing; and more recently we have been favored with a volume entitled "Designs for Cottage Residences," by the same author.

Civil engineering has been admitted to rank as a liberal profession within our own times, both here and in England. Canals and railroads have been constructed so rapidly, that it would be almost impossible to distinguish among the engineers, and award to each the merit justly due. We have mentioned a discovery of valuable hydraulic cement. We may add, that very accurate knowledge has been obtained of the comparative strength, durability and economy of materials, and that a distinguishing characteristic of our public works, is the nice adaptation of means to the ends to be accomplished.

The aqueduct by which the city of New-York is supplied with water, will be an enduring monument, and a description of that work will, perhaps, convey the best information which can be given of the present condition of mechanical science. The conduit commences at the Croton river, in Westchester county, where a dam has been constructed, raising the water of that stream 40 feet above its natural level, and 166 feet above mean tide. The aqueduct is prolonged down the valley of the Croton to the shore of the Hudson, thence through

* Notes on Agriculture were received from Willis Gaylord, Esq. and notes on Horticulture from A. J. Downing, Esq.

the villages of Sing-Sing, Tarrytown, Dobb's ferry and Yonkers, where, leaving the Hudson and crossing the valley of Sawmill river and Tibbitts brook, it gains the summit between the Hudson and East rivers, and continues on that summit to the Harlem river, a distance of 32·880 miles of continuous masonry. Iron pipes are then laid 1450 feet, on an arched bridge, across the valley of the Harlem river, at an elevation of 114 feet above high tide. After crossing the valley, the aqueduct of masonry is resumed and continued two miles to the Manhattan valley, which is passed with iron pipes, descending 102 feet to the bottom of the valley, and continued rising again to its opposite side, the distance across the valley being 0·792 mile. The masonry conduit is again resumed, and crossing the Asylum ridge and the Clendinning valley, is continued 2·173 miles to the receiving reservoir at Yorkville. This basin is 1826 feet long and 836 feet wide, and including its embankments, contains an area of thirty-five acres divided into two parts; from thence iron pipes are laid beneath the surface of streets 2·176 miles, to the distributing reservoir at Murray hill, three miles from the City Hall.

This reservoir is 420 feet square, and covers four acres. It is divided into two equal parts, and has an average elevation of 44·05 feet above the level of the adjacent streets. The length of the aqueduct, including the iron pipes and reservoir, from the Croton dam to the receiving reservoir, is 45·562 miles; and including the elevated surface of the Croton river, and the large mains conducting the water from the distributing reservoir through the central parts of the city, the entire length is 50 miles, of which the masonry conduit constitutes 37·067 miles. The rocks through which the line of the aqueduct passes are two marble quarries in Westchester, and for the residue of the route gneiss of many varieties. A large portion of the open cutting, and nearly all the tunnel cutting, have been made through rocks, more than 400,000 feet of which have been excavated. The formation of the ground is very irregular. There are on the line sixteen tunnels, varying in length from 160 feet to 1263 feet, and being in aggregate length 6841 feet. The height of the ridges

above the great level at the tunnels, ranges from 25 feet to 75 feet. In Westchester county, the line of the aqueduct is crossed by twenty-five streams, at depths varying from 12 to 70 feet below the grade line. Besides these there are numerous other brooks and valleys of less depth, over which culverts are constructed. The most important valleys on the Manhattan island, over which the aqueduct passes, are the Manhattan valley, Clendinning valley and Bowne's valley.

The bottom of the aqueduct is an inverted arch; the chord or span line is 6 feet 9 inches, and the versed sine 9 inches; the masonry of the side walls rises four feet above the springing line of the inverted arch, with a bevel of one inch to a foot rise, or four inches on each side, which makes the width at the top of the side walls 7 feet 5 inches. These walls form the abutments of the roofing arch, which is a semicircle, having a radius of 3 feet $8\frac{1}{2}$ inches, or a chord line of 7 feet 5 inches. The greatest interior width of the aqueduct is 7 feet 5 inches, and the greatest height 8 feet $5\frac{1}{2}$ inches. The area of the interior is 53·34 square feet.

The plan, dimensions and kind of masonry, are as follows: In excavation, a bed of concrete masonry is laid down as a foundation; it is laid level across the bottom, 3 inches thick at the centre of the inverted arch, and curved on its upper surface to form a bed for the arch, which brings it 12 inches thick at the spring line, and is carried 3 inches thick under the side walls, or abutments. The abutments are 2 feet 8 inches thick at the spring line of the inverted arch, and 2 feet at the top or spring line of the roofing arch. The inverted arch is of brick 4 inches thick; the roofing arch is also of brick 8 inches thick. The abutments or side walls are of rubble stone, with a brick facing of 4 inches thick. Spandrels, of stone, are carried up solid from the exterior angle of side walls on a line that is tangent to the arch. When the bed of concrete is formed for the inverted arch, a heavy course of plastering is laid over it, on which the arch is laid. When the stone work of the side walls was up, the face that received the brick lining had its irregularities filled with successive courses of plastering, and

finally an uniform course of a quarter of an inch in thickness over the whole, in front of which the brick facing was laid up. A course of plastering was also put over the roofing arch. The concrete masonry was formed by mixing one part hydraulic cement, three parts clean sand, and three parts fine broken stone. The masonry was all laid up in hydraulic cement. The mortar for the stone work was composed of one measure of cement to one of clean sharp sand; and that for the brick and plastering consisted of one part of cement to two of sand.

The area of a cross section of the masonry is,

Concrete masonry,	4,605	square feet.
Stone inside walls,	21,572	"
Do in spandrels,	2,690	"
	28,867	
Brick in arches and side facing,	13,658	square feet.
Total,	42,525	"

In embankment the concrete masonry is laid on foundation walls, has one foot extra thickness and three feet in extra width. The base of the side walls is also increased, and the proportion of cement to sand in concrete and mortar for stone work, is 1 to $2\frac{1}{2}$ feet.

The proportion of embankment to excavation on the line of the aqueduct, is about as one to eight. The aqueduct is covered with earth of sufficient depth to protect it from frost. To pass streams, there are one hundred and fourteen culverts, the aggregate length of which is 7,959 feet, and varying in span from $1\frac{1}{2}$ feet to 25 feet. There are five road culverts from 1 to 20 feet span. All the culverts are constructed in the most improved manner, laid in hydraulic cement.

There are thirty-three ventilators, to give free circulation of air through the aqueduct. They rise fourteen feet above the surface of the ground, tapering towards the top, and are of circular form, constructed of well dressed stone, and have an aperture of fifteen inches in diameter: they are placed at a distance from each other of one mile.

There are six waste-weirs, constructed of well dressed stone, having cast-iron

gates and gate frames fitted to stone jambs and lintels. The frames are faced with brass for the gates to work against. The gates are operated by a wrought-iron screw rod, with a brass nut working in a cast-iron socket. The water falls from the gates into a well, and is carried off through a culvert. The waste-weirs are protected by stone buildings with brick arch roofs.

The dam in the Croton river, as first constructed, was provided with a waste-weir 90 feet wide, which, in the high flood of January, 1841, proved insufficient to pass the water, and a breach was made in the embankment about 200 feet long. This breach was then filled by a structure of hydraulic stone masonry, adopting 180 feet thereof as an additional waste-weir. The greatest height of the weir of the dam is 40 feet above the low water mark, and 55 feet above the bed of the river. The width of masonry at low water line of the river is 61 feet. The form on the lower face commences on a curve described by a radius of 55 feet, and continues to within about 10 feet of the top, when a reversed curve, on a radius of 10 feet carries the face over and meets the back line of the wall. The back line is carried up vertically, with occasional offsets. The main body of the work is laid up of rough stone; the curve face of large and closely cut stone with four heavy courses at the bottom dovetailed together; the joints cut to the line of radius of curve. Above the masonry an embankment of masonry is filled in in width 275 feet on the bottom, with a slope of 1 to 5 on the up-stream face. The north end of the new weir is terminated by an abutment which rises 12 feet above it.

From the toe of the masonry an apron is extended 35 feet, composed of hewn timber, well secured, and filled for 16 feet from the stone work, with concrete masonry; and the remainder with loose stone, and the whole covered with a course of six inch white elm plank. A second apron is made, extending 30 feet further. At 300 feet below the main dam is a second dam nine feet high, which sets the water over the apron of the main dam, and thus forms a pool to check the water as it falls over the weir. About 120 feet of the foundation of the dam is of concrete masonry, laid down on a very firm hardpan, and the remainder

upon timber piers, the spaces between which are filled with concrete masonry. The dam sets the water of the river back about five miles, and forms a reservoir covering about 400 acres.

The gateway which guards the entrance to the aqueduct, is placed on the solid rock, in a situation not exposed to the floods. The gate chamber is provided with a double set of gates; one set of guard gates set in cast-iron frames; the other, a set of regulating gates made of gun metal, set in frames of the same material. The gates are all 18 by 40 inches, and there are nine in each set, and they are operated by means of wrought-iron screw rods. The gate chamber and bulkheads are constructed of well-dressed masonry laid in hydraulic cement. The water is conducted from the reservoir into the gate-house by a tunnel cut 180 feet through the rock, and flows into the bulkhead at the upper end of the tunnel from a level averaging 10 feet below the surface of the reservoir. The builders of this dam were McCullough, Black, McManus and Hepburn.

The Sing-Sing kill, the bottom of which is 66 feet below the grade line of the aqueduct, is crossed by a bridge resting on a single arch of 88 feet span and 33 feet rise. The form of the arch is an oval drawn from five centres. The bridge is constructed of well dressed masonry laid in hydraulic cement. The builder was Andrew Young, of Philadelphia.

The width of the Harlem river, where the aqueduct crosses it, is 620 feet at ordinary high water mark. The shore on the southern side is a rock rising from the water's edge, at an angle of about thirty degrees, to a height of 220 feet. On the northern side a strip of table land forms the shore, and extends back from the river four hundred feet to the foot of the rocky hill, which rises at an angle of about twenty degrees, to the level of the aqueduct. The table land is elevated about 30 feet above the river. The channel of the river to which the water is reduced at very low tides, is 300 feet wide, and the greatest depth is 16 feet. The bridge which is now in progress of construction, crosses this valley on eight arches, each of 80 feet span, resting on piers that are (at each extremity and in the centre) twenty feet wide at the spring line of arches, with in-

termediate piers that are 14 feet wide at the spring line. On the south of this range of large arches, there is one, and on the north, there are six arches, each of 50 feet span, resting on piers seven feet wide at the spring line, and two abutments that terminate the arch work of the bridge. From the abutments a continuous line of wall of dry stone work is extended to the gate chambers on each side. The length of the bridge is 1450 feet. The height of the river pier above high water line, is 60 feet to the spring of the arches, and 95 feet above the lowest foundation. The arches are semicircular, and the height 100 feet to the soffit or under side at crown; to the top of the parapets 114 feet above ordinary high water, and 149 feet above the lowest foundation. The width on the top of the parapets is 21 feet. The space between the parapets is arranged to receive and protect from frost two cast iron pipes, each four feet in diameter, and lying 12 feet below the grade line of the aqueduct, and connected at each end of the bridge with the masonry aqueduct by gate chambers. To make the capacity of the pipes for conveying water equal to that of the aqueduct, an extra fall of two feet has been given across the bridge, and the aqueduct on the southern side is depressed two feet below the grade to accommodate this arrangement. The utmost care and skill have been bestowed in securing durable foundations for the piers. The material of the bridge is well dressed granite. While the bridge remains unfinished, the water is conveyed in iron pipes in the shape of an inverted syphon. The immense and expensive structure which has been described, was deemed necessary, by the legislature, to prevent obstruction of navigation of the Harlem river.

The greatest depression of the Clendinning valley is 50 feet below the top of the aqueduct, and the valley is 1,900 feet across. Streets cross the line of the aqueduct in this valley at right angles. The aqueduct passes the valley on a bridge, and archways are constructed over three of the streets. The archways for each street are one for carriage way of thirty feet span, and an arch on each side for side walks of ten and a half feet span. The style of masonry is the same as that of the Sing-Sing bridge. That part of the bridge which has no

provision for street arches is composed of a continuous wall of masonry, carried up on a bevel of one-twelfth its rise to the grade line of the aqueduct, where it is thirty feet wide. The outside or face of this wall, for one foot in breadth, is laid in hydraulic mortar, and the remainder is dry masonry, consisting of courses of large stone, with the interstices thoroughly filled with small broken stones.

The receiving reservoir is formed with earth banks, the interior having regular rubble walls, and the outside is protected by a stone wall laid up on a slope of one horizontal to three vertical; the face laid in cement mortar, and the inside dry. The inside is protected by a dry slope wall laid on the face of the embankment, which slopes one and one-half horizontal to one vertical. The embankments are raised four feet above the top water line, and vary in width from eighteen to twenty-one feet. Vaults or brick archways are constructed, in which iron pipes are laid, so arranged that the pipes from the northern division of the reservoir connect with those of the southern division, and thence pass off to the distributing reservoir, and to supply the adjacent districts. The vault on the eastern side is 540 feet long and is 16 feet span; that on the western side is 400 feet long and 8 feet span. The pipes are all provided with stop-cocks, and so arranged that they can receive water from either division, except one pipe from each division leading to the distributing reservoir. A pipe is put through the division bank with a stop-cock, to allow the water, or not, to pass from one division into the other. The aqueduct insersects the reservoir at right angles with its westerly line, and 252 feet south of the northwesterly corner. At this point a gate chamber is constructed, with one set of gates to pass the water into the northern division, and another set to pass it into a continued conduit of masonry constructed within the embankment of the reservoir, to the angle of the southern division, which the water there enters by a brick sluice. This arrangement gives the power of directing the water into either division, or both, at the same time. A waste-weir is constructed in the division bank. It has not been deemed necessary to complete the excavation of this reservoir. It has at present a capacity for 150,000,000 imperial gallons.

The distributing reservoir is built upon ground higher than any part of the city south of it. The walls are built upon a foundation sunk five feet below the grade of the streets, and are of hydraulic stone masonry, constructed with openings, to reduce the quantity of masonry and give a more enlarged base. The openings are made by an exterior and an interior wall, connected at every ten feet by cross walls, which are carried up to within seventeen feet of the top, and then connected by a brick arch thrown from one to the other, and the spandrels between them levelled up solid, and a course of concrete put on the whole six inches thick, which reaches a level ten feet below the top on which the exterior wall is carried up single to the top. The exterior wall has a bevel of one to six, and is uniformly four feet thick from the bottom to the top of the connecting arches. The inner wall is carried up plumb with off-sets; the lower section six feet thick; the middle section five feet thick. The span between the exterior and interior walls at 41 feet below the top is 14 feet, or 24 feet from the outside of exterior to the inside of interior walls, and the span between them at the spring of the connecting arches, in consequence of the bevel of the exterior wall, is reduced to 9 feet and 9 inches; and from outside of exterior to inside of interior walls, 17·75 feet. The cross walls are four feet thick at the bottom, and have an off-set of six inches on each side, at eight feet below the spring line of the connecting arches, and have openings at a suitable level near the bottom, to allow the construction of drains, and to permit persons to pass in and examine the work.

On each corner of the reservoir, pilasters 40 feet in width are raised, projecting four feet from the main walls, and in the centre on the streets and on the 5th avenue, are pilasters 60 feet wide, and projecting six feet. The pilaster in the centre on the 5th avenue, rises seven feet above the main wall, and all the others four above. Doors are placed in the central pilasters on 40th and 42d streets, which give access to the pipe chambers. In the central pilaster an entrance is made by a door to a stairway that leads to the top of the walls. On the outside walls is an Egyptian cornice, which accords with the general style of

the work. Inside of the walls of masonry, a thorough puddled embankment of suitable earth is formed, 58⅓ feet wide at the line of the reservoir bottom, and sloping on the inside face 1½ to 1 per 24 feet high, and making, with the walls on top, a width of 17 feet; the face of the banks is lined with a course of rubble hydraulic masonry 15 inches thick, and coped with dressing stone. The bottom is an impervious hardpan, on which two feet of puddled earth is laid, and this covered by 12 inches of hydraulic cement. The reservoir is divided into two divisions by a wall of hydraulic masonry; the wall is 19 feet thick at the bottom, 6⅔ feet at top water line, and 4 feet at the top. In this wall a waste-weir is placed, with a well of two falls, together 52 feet, from which the waste water enters a sewer and passes off about one mile to the Hudson. In each division there is a waste cock to draw the water from the bottom. The reservoir is designed for 36 feet of water, and when full, will stand 115 feet above mean tide. The walls rise four feet above the water line. An iron railing is to be placed around the walls on the top of the cornice. The capacity of this reservoir is 20,000,000 imperial gallons.

The general declivity of the aqueduct is 0·021 foot per hundred, or a fraction over 13¼ inches per mile. The Croton reservoir, which has received the name of Croton lake, is available for 500,000,000 imperial gallons of water, above the level that would allow the aqueduct to discharge 35,000,000 gallons per day. The flow of the Croton river is about 27,000,000 of gallons in twenty-four hours at the lowest stages. The work was commenced in May, 1837, and so far completed that the water was admitted into the distributing reservoir on the fourth of July last. The survey, plans and estimates of the work were made by professor Douglass, who was succeeded as chief engineer by John B. Jervis. The aqueduct has been constructed at the expense of the city of New-York, under the direction and supervision of commissioners appointed by the governor and senate. The following persons have been commissioners: Stephen Allen, Walter Bowne, Benjamin M. Brown, Saul Alley, Charles Dusenbury, William M. Fox, Thomas T. Woodruff and Samuel R. Childs. The present commissioners are,

Samuel Stevens, John D. Ward, Benjamin Birdsall and Zebedee Ring. The cost of the work is about twelve millions of dollars.*

In 1823, a place was assigned to the science of civil engineering in the programme of studies at the United States military academy at West-Point. This excellent national institution traces its origin to the recommendation of Washington. It was founded in 1802, and having received especial care and attention under the administration of Jefferson, was enlarged in 1812, on the earnest recommendation of Madison. The school consists of two hundred and fifty cadets, divided into four companies, and taught in the field all the duties of the military profession. They are divided, for theoretical instruction, into four classes, and four years are required to complete the entire course of studies. That course includes mathematics, the French language, English composition, rhetoric, geography, topographical drawing, natural and experimental philosophy, chemistry, landscape drawing, engineering, the science of war, ethics, constitutional law, infantry tactics, artillery, pyrotechny, mineralogy and geology.†

Although our civil architecture is open to criticism, yet several of our state and municipal edifices furnish evidence of improving taste. The custom house, the exchange, the university and the halls of justice in New-York; the exchange, public edifices and academic structures in Albany, and the lunatic asylum at Utica, and the state prison at Auburn, although they exhibit departures from severe canons, are nevertheless believed to be creditable to the enterprise of our citizens. Not much can be said in praise of the monumental branch. Notwithstanding some puerility of detail, when we compare St. Paul's and the old Trinity with more recent structures, we might infer that sacred architecture was declining. Our domestic architecture has improved with the increase of wealth in private life. While we cannot now, or ever hereafter, compare with the palaces of individuals who enjoy hereditary wealth and rank in other countries,

* An account of the Croton aqueduct, prepared by J. B. Jervis, chief engineer, was received from Samuel Stevens, the president of the board of commissioners. See plates of the aqueduct at the end of the volume.

† Notes concerning the Military Academy were received from Colonel De Russy, U. S. A.

we may safely claim, that for suitableness to our social state, and for all that can minister to domestic convenience and comfort, the edifices of our citizens are not surpassed in any other community.* Our naval architecture may perhaps justly be regarded as a peculiar triumph of American genius. Our packet ships engaged in foreign trade, and especially the steam palaces which float upon the Hudson river, Long Island Sound and the lakes, combine the elements of strength and beauty with great speed and perfection of internal arrangements. While the civilized world is in the full enjoyment of the advantages of steam navigation, the people of New-York, at least, need not to be reminded of their obligations to her own eminent citizens, Robert Fulton, John Stevens and Robert R. Livingston. Experiments on steam navigation were commenced in 1791, by John Stevens, of Hoboken. He invented the first tubular boiler. His first attempts were made with a rotary engine, for which, however, he speedily substituted one of Watts'. With various forms of vessels, and different modifications of propelling apparatus, he impelled boats. In 1797, chancellor Livingston built a steamboat on the Hudson, and the legislature granted an exclusive privilege of steam navigation, on condition that he should, within a year, produce a vessel impelled by steam at the rate of three miles per hour. Being unable to perform this condition, the privilege failed. Livingston and Stevens united their efforts with Nicholas Roosevelt in 1800, but without success. Chancellor Livingston pursued his favorite object in Paris, where he engaged the efforts of Fulton. Fulton, after a trial of various other apparatus for propulsion, decided that the paddle wheels possessed the greatest advantage. He then planned a mode of attaching wheels to Watts' engine, and finding the experiment successful in a trial on the Seine, it was determined by him and Livingston to build a large boat upon the Hudson. He then proceeded to England, and personally superintended the construction of a new engine by Watts and Bolton. This engine was received in New-York in 1806, and the vessel prepared for it was set in motion in

* Notes on Civil Engineering and Architecture were received from Prof. MAHAN, of the United States Military Academy of West-Point.

1807, the legislature having extended the law. During this time Stevens had persevered in his efforts at home, and only three or four days after Fulton's success was established, Stevens had a boat in motion with the required velocity; and as his experiments were entirely separate from those of Fulton, he seems justly entitled to divide the honor which, by the popular judgment, is exclusively awarded to Fulton.*

The labors in hydrography of Edmund M. Blunt and his sons, deserve especial notice. The American Coast Pilot was first published in 1796, and was then a small pamphlet of about eighty pages, containing an account of the chief harbors in New-England, with sailing directions, and has been, by labors and additions through forty years, augmented to a volume of about one thousand pages, giving an accurate account and directions for navigating the eastern coast of America, from Labrador to Cape Horn, including that of the West India islands.

While the country, and especially this state, has been steadily rising into great commercial and maritime importance, the government, until 1830, manifested a total neglect of hydrographical science; yet through the persevering enterprise of Mr. Blunt, there are to be found in the Coast Pilot as full and complete directions for the navigation of the American coast, as those furnished with the aid of government in other countries.

No actual surveys were made of this part of the American coast, until 1822, when Mr. Blunt surveyed the harbor of New-York, and its eastern entrance. In 1827 he extended his surveys to Long Island Sound, and made an elaborate survey of the coasts of that arm of the sea, which has proved to be a survey of the greatest utility to commerce. Some estimate may be formed of the extent of this private enterprise, when it is recollected that the coast to be surveyed was two hundred and fifty miles in length, and that many islands and bays are comprehended in the survey.

Since that time the great triangulation of the coast, by the authority of the federal government, has been extended over the same coast, under the direction

* Encyclopædia Americana.

of professor Hasler as principal, and James Ferguson of Albany, and Edmund Blunt of New-York, assistants.

The charts used throughout the United States, both of the coast of the United States and the West Indies, are published by E. and G. W. Blunt, and they have entirely superseded the foreign charts, being original drawings, continuing the new discoveries and corrections with the general outline adopted in the English charts.

In connection with this subject, it is proper to state that directions have been given for an accurate triangulation of the Niagara river at Niagara falls, and the result will be given in one of the following volumes.

Unhappily there is not in this, nor in any other country, a taste sufficiently general for the study of the useful arts. Occasionally a brilliant invention arrests the attention of mankind, and homage is involuntarily yielded to a discoverer who has contributed to the well-being and happiness of our race. But the laws of mechanics, although fixed, invariable and easy of comprehension, remain unstudied and unregarded. Neglecting inquiry into the processes by which results have been attained, society is content to pay its tribute of admiration for the results themselves. Inventions are brought into general use, and curiosity concerning the inventor, and the progress of his discovery, ceases altogether; or if, like the printing press and the steam engine, the invention marks a new era in the march of civilization, a confused association of the author's name with his invention takes possession of the public mind, and millions repeat his praises without at all inquiring into the justice of the award. Although mechanical inventors are busy among us, we have few trophies of the genius of our citizens besides the application of the steam engine to navigation. MacAdam, the inventor of the well-known improvement in the mode of constructing common roads, was a native of New-York, although his genius received its development in England, whence we have received his invention. Paul K. Hodge has published a work called "The Steam Engine, its origin and gradual improvement from the time of Heron to the present day, as adapted to manufactures, lo-

comotion and navigation," which is held in high esteem. The author has the merit of having invented the steam fire-engine, a machine of great importance in populous cities. James Renwick has written several valuable treatises, among which we may mention "The Application of the Science of Mechanics to Practical Purposes;" and also a work "On the Steam Engine." Alexander S. Byrne has published "Observations on the best mode of propelling ships." William C. Redfield's "Essays on Meteorology," and on "The Causes of Hurricanes," have attracted much attention in that abstruse and unexplored field of science. It must be admitted that he has ably defended his theory in opposition to that of professor Espy. The labors of professor Davies in the science of pure mathematics, and those of professor Mahan in that of mixed mathematics, and its applications in civil engineering and kindred departments, conducted, as they have been, at the United States military academy in West-Point, are claimed as a valuable portion of the scientific property of the state. Doctor Nott's improvement of furnaces for burning anthracite coal, has been especially useful in the manufacture of machinery and in the improvement of steam navigation, as well as conducive to health and the comforts of social life. An important and valuable work has just issued from the press, entitled "A descriptive and historical account of hydraulic and other machines for raising water, ancient and modern," by Thomas Ewbank of New-York. The author, who is deeply versed in mechanical science, has, by a collection of rare and curious facts in the progress of invention, presented in a spirited yet unaffected manner, attempted to disturb the popular indifference to mechanism, and to invest that science with the interest of history and the charm of romance. His extensive, minute and accurate account of the more important engines and machines now in use, renders his work exceedingly useful to the student in that department.*

From notices of practical applications of science, we pass to a brief review of the progress of literature, and shall, for obvious reasons, dwell most upon such productions as especially illustrate points in the character, condition or circum-

* Notes on the Useful Arts were received from Rufus W. Griswold, Esq.

stances of the state. The history of the races which inhabited the American continent previously to the planting of the European colonies, is a vast field imperfectly explored. Ancient fortifications erected anterior to the discovery of America, have been found in all parts of the state. De Witt Clinton, after personal examination, described the ruins of fortifications in Pompey, Onondaga county. In several parts of that town, there are remains of ancient populous settlements. The site of the ruins is on the high ground which divides the waters which flow into Chesapeake bay, from those which seek the ocean through the gulf of St. Lawrence; and the formations between this ridge and the shore of Lake Ontario indicate an abrasion of rocks, and a recession of the waters by which the valley has been exposed. The ruins are similar to those found in the interior of the continent; from an examination of which our antiquarians have, with great unanimity, deduced the opinion that a vast population, many ages since, existed on the continent, having large towns, possessing military defences, and pursuing agriculture, and more advanced in civilization than the aboriginal nations which have inhabited the same country since the European discovery. Many interesting relics found in such ruins have been preserved in the Albany Institute, especially utensils made of pottery. There is another class of ruins which furnish traces of visits by Europeans, of which there is no historical account. The Indians found in the settlement of the colony, have no reliable tradition concerning either of these descriptions of ruins. A few rude characters etched upon the rocks are all the enduring hieroglyphics, found in the northern portion of the continent east of the Hudson; and these are unintelligible, although the learned and ingenious Schoolcraft supposes that he has discovered a key to unlock the mystery. Monuments every where remain, but they bear no records of the eloquent, the wise and the brave, who may have flourished in a long lapse of ages. Even the origin of the present aboriginal races is involved in mystery, and the curious and learned are equally divided on the question, whether the ancestors of these races were drifted upon the southern division of the continent, from the islands of the South Sea, or whether they were of

Tartar origin, and found their way there by crossing Behring's straits. Yet another theory derives the aborigines from the Northmen of Europe. This theory is based upon the resemblance of the American Indians to the Esquimaux, and between the Esquimaux and the Laplanders. Dr. Samuel L. Mitchill maintained this hypothesis. Henry Wheaton, now minister of the United States at the court of Berlin, has pursued investigations which, together with those of the Swedish antiquaries, have produced a general conviction that the Northmen visited the shores of New-England several centuries before the discovery of America by Columbus; and it is argued that if the bold adventurers in the age of Eric the Red could traverse the North seas from Norway to Greenland, and thence to the American coast, spirits equally brave might have done the same ages before. Other speculators have attempted to trace the descent of the American Indians from the Canaanites driven from Palestine by Joshua. Grotius and Martyr believed that Yucatan was first peopled by Christian Ethiopians; while some regard those races as descendants of the long lost ten and a half tribes of the children of Israel.*

The first colonial historian of the Six Nations was Cadwallader Colden, and his work is valuable although it reaches only to a very short period subsequent to the peace of Ryswick. The work is certainly good authority as a record of facts, and manifests a benevolent spirit and an inquiring genius. It is especially interesting also because it shows that each of the Five Nations was a distinct republic, while they were all bound in a confederacy with a grand central council at Onondaga. Colden, however, is supposed to have erred in adopting the French opinion, that the Five Nations had only recently occupied the country in which they were found at the time of the discovery of the continent. David Cusick, an educated Tuscarora Indian, about twenty years ago published a history of the Six Nations, derived from their traditions. This work, which as a merely literary work is without merit, nevertheless establishes the fact, if any reliance can be placed on Indian tradition, that the five nations resided in the country now con-

* Adair, Boudinot, Miller, M. M. Noah.

stituting western New-York, for a very long period anterior to the first visit of the Europeans. But Cusick's chronology is almost as wild as that of the Chinese or the Hindoos, for he gives accounts of the reigns of a long line of kings, reaching through a period of thousands of years. There are two points, however, in the traditions of the Six Nations which are both curious and important, to wit, the resemblance between their cosmogony and that of the Hindoos, and the fact that the Noachian deluge is incorporated in their legends, as it has been found in all the barbarous nations on the eastern continent. A discourse, pronounced before the Historical Society of New-York, in the year 1811, by De Witt Clinton, presents the most useful compendium of the history of the Six Nations. Sir William Johnson wrote a series of letters to Arthur Lee of Virginia, upon the manners, customs and government of the Six Nations, but it is not known whether the work is extant. The reverend Samuel F. Jarvis, then of New-York, but now of Connecticut, in 1819, produced a learned and eloquent treatise on the religion of the North American Indians, in the form of a discourse before the New-York Historical Society. William Smith, in his History of New-York, has given the history of the Six Nations, but it is little more than a compendium of Colden's writings on the same subject.

The most elaborate and authentic modern work upon the origin of the American red man, and the antiquities of that race, is that recently given to the public by Alexander W. Bradford. His researches and inquiries embrace the wide region from the snow huts of the Esquimaux to the palace of the Incas. His conclusions are, that all the various nations and tribes inhabiting America at the time of its discovery were derived from one primitive civilized source, and that the emigration to this continent proceeded from southeastern Asia through the Indian Archipelago, and across the islands of the Pacific ocean. This theory, however, has yet to abide the test of inquiry.

George Catlin spent several years among the aboriginals of the far west, and his volumes are curious and interesting, regarded as a sketch of the living manners of the inhabitants of the forest. In the department of Indian philology,

Albert Gallatin has given us an elaborate and invaluable essay upon the structure of the American languages, illustrating the tongues of fifty-three nations.

William L. Stone has had the felicity to appropriate to himself the department of Indian biography. His first work was "The Life of Joseph Brant, or Thayendanegea." The title, however, does not convey a just idea of the work, which is a complete history of the Iroquois confederacy during the life of the hero. Brant was the leader of the Indian auxiliaries of the British army during the revolution. The work is rich in historical information, concerning the border scenes of that eventful struggle. The next work, by the same author, was the Life and Times of Red Jacket, or Sa-go-ye-wat-ha, the last great orator of the Iroquois confederacy. In this work the history of the Six Nations is resumed at the period of the death of Brant, and continued until the late dissolution of the league. The speeches of Red Jacket, preserved in this volume, will for all time become more interesting as authentic exhibitions of the rhetorical art, as it existed in a barbarian community. The Life of the Seneca White Woman, called by the Indians Deh-he-wa-mis, by James G. Seaver, is especially valuable for the light it throws upon the history of Sullivan's campaign in the Genesee country in 1779. The affecting story of Wyoming is known to every reader of Campbell's touching and most beautiful poem. But for an authentic narrative of the painful events which the poet celebrated, we are indebted to William L. Stone. William W. Campbell's Annals of Tryon County is a valuable contribution to the history of the state, and especially instructive concerning the trials and sufferings of our frontier population exposed to Indian barbarities during the war of the revolution. Edwin James has given us a narrative, by John Tanner, a Virginian, who was captured by the Indians in his childhood, which abounds in information concerning the Indians in the interior of the continent, and especially their manners, sentiments and customs. Tanner became entirely assimilated to the Indians, and this interesting book was written from his own lips, and may be deemed, therefore, a production of Indian autobiography. Washington Irving's Memoir of Philip of Poconoket, a fierce yet magna-

nimous warrior, celebrated in the annals of Massachusetts, and who fell in a chivalrous effort to drive the intruding white man from the continent, is written with all the benevolent spirit and taste of its accomplished author. Henry R. Schoolcraft, a native of this state, but now a citizen of Michigan, has been a philosophic and enthusiastic student of the languages and unwritten literature of the red men. Besides many important contributions to our reviews, he has given us in his work, under the fanciful title of Algic Researches, a library of Indian romance, very precious, and such as no other than its author could have gathered and so tastefully arranged. Much assiduity has been manifested in collecting materials for the history of New-York. The description of the New-Netherlands, by Adrian Vanderdonck, translated by Jeremiah Johnson, abounds in curious and interesting information concerning the early condition of the colony, and its relations with the Indians and with the other provinces.*

The earliest English accounts of the colony which remain, is "A Brief Description of New-York, formerly called New-Netherlands," by Daniel Denton, a small quarto printed in London in 1607. The author informs us that the book was written with the object of giving "some directions and advice to such as shall go there, an account of what commodities they shall take with them, and the profit and pleasure that may accrue to them thereby." There is a copy of this curious work in the state library.

It is perhaps not generally known that the name of the city of New-York, which was assumed in 1664 was, in 1673, changed to New-Orange. This fact appears from "A View of the City of New-Orange, as it was in the year 1673, with explanatory notes, by Joseph W. Moulton." This pamphlet abounds in very curious and apparently very authentic information concerning the manners, customs and habits of the period to which it relates. A pamphlet was published in New-York, in 1799, entitled "A Description of the Settlement of the Genesee Country in the state of New-York," in a series of letters from a gentleman to his friend.

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* Notes on Antiquities and the Press were received from the Honorable GABRIEL FURMAN. Notes on Female Biography and Indian History were received from WILLIAM L. STONE, Esq.

It is valuable, as containing a history of the progress of the settlement of western New-York previous to the commencement of the present century. Joseph W. Moulton, about twenty-five years since, associated with John Van Ness Yates, to produce a history of New-York, and the excellence of the volume published has caused a very general regret that the purpose of the authors was relinquished.

In 1829, there appeared a work entitled "The Natural, Statistical and Civil History of the State of New-York," in three volumes, by James Macaulay. This work, although very comprehensive, was supposed to be inaccurate, and it has not obtained rank as a standard work. William Dunlap subsequently attempted to execute a history of the state, and he collected very valuable materials, but his talents and acquirements were not equal to so ambitious an undertaking. More recently Jabez D. Hammond has published two very interesting volumes, containing the political history of the state of New-York, from the adoption of the constitution until 1840. The work is written with candor and with studied accuracy.

"A Sketch of the first settlement of the towns on Long Island," by Silas Wood, is a very valuable and authentic work. "The History of Long Island," by Benjamin F. Thompson, published in 1839, is rich in local incidents and illustrations of public characters. "Sketches of Rochester, with Notices of Western New-York," by Henry O'Reilly, published in 1838, contain very useful information concerning the settlement of the western counties. The publications of the New-York Historical Society deserve a conspicuous place among the historical productions of the state. This society was formed in 1804, and received a charter from the legislature in 1809. Among its founders were De Witt Clinton, Daniel D. Tompkins and Rufus King, bishop Moore, the reverend Dr. Hobart afterwards bishop, the reverend Drs. Millers and Kunrey, Drs. Mitchill and Hosack, and other eminent citizens. The society subsequently received liberal aid from the state. They have collected a large and valuable library of historical works, in manuscript as well as printed volumes, and have already published six volumes of transactions. At the instance of the Historical Society, the legisla-

ture authorized the appointment of an agent to visit Europe, and select and transcribe documents in the archives of European states, which might tend to illustrate our colonial history. John Romeyn Brodhead, who was appointed to perform that duty, has, through the liberality of the governments of the Netherlands and of Great Britain, explored the archives of those countries, and collected a mass of valuable official papers, commencing with the discovery of the colony, and reaching to the close of the revolution. The agent is now in Paris, and is improving the generous permission given him by the king of the French to explore the public offices in that city, for materials for perfecting that part of our history which relates to the wars between the English and French, many scenes of which occurred in the western and northern parts of this state. The legislature also, on the suggestion of the Historical Society, has, within the present year, completed the publication of the legislative history of the state, by giving to the press the journals and correspondence of the revolutionary provincial congress, the council of safety and committee of safety. But the attention of our historians has not been exclusively confined to our own state. Francis L. Hawks, under the title of "Contributions to the Ecclesiastical History of the United States," has written the history of the church in Virginia and Maryland. J. Fennimore Cooper's History of the Navy of the United States, is justly regarded as a national work. "Notices of the War of 1812," by John Armstrong, late secretary of war, were published in two volumes.

The life of Philip Schuyler is yet unwritten, if we except the sketch contained in chancellor Kent's historical discourse. We have also only a brief eulogistic notice of chancellor Livingston. The fame of John Jay has been more fortunate, the life of that christian statesman having been fully, impartially and elegantly written by his son, William Jay, of Westchester county. We are indebted to that indefatigable national biographer, Jared Sparks, for ample volumes giving us the personal and political history of Gouverneur Morris. John C. Hamilton has produced two volumes, bringing down the life of Alexander Hamilton to the period when the federal constitution was formed. The work is

executed in a manner worthy of the subject, and praise can go no higher. Theodore Sedgwick, junior, has given us a very interesting work in the life of William Livingston, a native and long a citizen of this state, afterwards governor of New-Jersey. Dr. David Hosack wrote an obituary memoir of De Witt Clinton: the work is rather an eulogy than a biography, but the appendix to the volume contains a vast mass of materials illustrating the history of the state during the career of Clinton. James Renwick has written the life of Clinton, in a popular form, and it has found a place in the school district library. To Samuel L. Knapp we are deeply indebted for a life of Thomas Eddy, who, as has been seen, was distinguished in promoting the canal policy, and who for his disinterested and efficient zeal in the cause of humanity, received from his contemporaries the name of the American Howard. He was the projector of the Society for the Reformation of Juvenile Delinquents in the city of New-York, under whose government is the House of Refuge; an institution justly pronounced by De Witt Clinton the "best penitentiary ever devised by the wit and established by the benevolence of man." The fame of Robert Fulton found worthy guardians in Cadwallader D. Colden and professor Renwick. Maryland owes great obligations to Henry Wheaton, of New-York, for a memoir which does ample justice to the eloquence, the patriotism, talent and professional learning of her son William Pinckney. It would be supererogatory to speak of the Life of Christopher Columbus, by Washington Irving.

Among the scanty materials for ecclesiastical history which we possess, we refer with pleasure to the Life of the reverend John H. Livingston, by Alexander Gunn; the Life of the reverend Samuel J. Mills, a devoted missionary of the Colonization Society, by Gardiner Spring; and the Life of the right reverend John H. Hobart, by McVickar, and also a Life of the same distinguished prelate by Berrien.

Among the productions of the prolific pen of the late Robert C. Sands, is a Life of that celebrated naval captain, John Paul Jones. Aaron Burr was a living mystery: his life has been written by Matthew L. Davis, with distinguished accuracy. It

is to be ascribed to the peculiarity of the subject that such an account, given with even the partiality of private friendship, has resulted in diminishing the interest which was universally felt in regard to colonel Burr so long as he lived, and which perhaps would have long survived him if his life had remained unwritten. The autobiography of colonel Trumbull throws light upon some portions of our revolutionary history, and upon many public characters during that period, as well as upon the progress of the fine arts. Henry C. Van Schaack has performed a filial duty with great propriety in his life of his father, Peter Van Schaack. The writer's object was to vindicate the purity of motive of that eminent lawyer in his neutrality during the revolution. The work adds very interesting materials for the full history of the great conflict, which yet remains to be written.

The National Portrait Gallery of distinguished Americans, by James Herring, consisting of four volumes, embellished with one hundred and forty portraits, is a work creditable to the literature and to the arts of the country. We can only notice, in passing, De Witt Clinton's Sketch of the Life of Philip Livingston, and the same author's Memoir of the Life of George Clinton, and similar sketches of Dr. Hugh Williamson and Dr. Bard, by David Hosack; of John Wells, by William Johnson; and of general James Clinton, by William W. Campbell. William L. Stone's account of the noted fanatic and religious impostor Matthias, contains many facts which will be useful to the student in mental philosophy. William Dunlap has left valuable materials for biographical literature, in his History of the American Theatre, and also in his History of the Arts of Design.

We must acknowledge and lament our deficiencies in female biography. Still, what works of that kind we possess, are exceedingly interesting. Among these is a memoir of Mrs. Ann Elizabeth Bleecker, published in 1793, by her daughter Margaretta V. Faugeres. We are indebted to Mrs. Grant of Scotland for the Life of an "American Lady," by which designation was intended Mrs. Schuyler, the wife of colonel Schuyler of Albany. The work is not without interest as mere biography, but it is also exceedingly instructive concerning the manners and customs which prevailed in the colony during the period which was included

in the close of the seventeenth and the commencement of the eighteenth century. The people of this state will cherish in grateful remembrance Isabella Graham, a Scottish lady, who passed the greater portion of her life in New-York, ministering to the poor, and alleviating the sorrows of the afflicted; and who was prominent among the founders of the orphan asylum in that city. A memoir of her life has been written by Divie Bethune. The poet Southey has said that the annals of English literature did not furnish a more brilliant example of precocious genius than Lucretia Maria Davidson. Her biography has been written by Miss Sedgwick. That it has been written well and justly, the name of the authoress is a sufficient guaranty. The genius of Margaret Miller Davidson, a younger sister of Lucretia, at a very early age produced fruits equally ripe, and which have been gathered and given to the public by the kind and gentle hand of Washington Irving. We conclude these notes of female biography with mentioning two works recently published, one a Memoir of Lucy Hooper, with Selections from her Poetical Remains, by John Keese. The memoir is a discriminating narrative of the life and character of a young lady of genius, and of deep and pure affections. The other work is the "The Missionary's Daughter," being a memoir of Lucy Goodale Thurston, by Mrs. A. P. Cummings. The subject was a daughter of one of the devoted band of missionaries in the Sandwich Islands, whose brief history is affecting and instructive.

Our library of travels is already quite voluminous. At the hazard of omitting many equally deserving of notice, we mention the following:

Travels in England, France, Spain, and the Barbary States, in 1813, '14, '15, by Mordecai M. Noah; 1819. A Tour from the city of New-York to Detroit, by William Darby; 1819. Travels to the Sources of the Mississippi, &c. under Gov. Cass, in 1820, by Henry A. Schoolcraft; 1821. Travels to the Central Portions of the Mississippi Valley, &c. in 1821, by the same; 1825. Narrative of an Expedition to the Source of the Mississippi, in 1832, under H. A. Schoolcraft, by the same; 1834. Narrative of the Loss of the American brig Commerce on the Coast of Africa, in 1815, by Capt. James Riley. A year in Europe.

1818–19, by John Griscom; 1823. Letters from Europe, &c. by N. H. Carter; New-York, 1827. (Two editions.) A Year in Spain, by Alex. S. McKenzie; Boston, 1829. Narrative of Four Voyages to the South Sea and the Pacific, 1822–31, by Benj. Morrell; New-York, 1831. Voyages Round the World, between 1792 and 1832, by Edward Fanning; New-York, 1832. Voyage of the U. S. Frigate Potomac, 1831–34, by J. N. Reynolds; 1835. A Winter in the West, by a New-Yorker, [Charles F. Hoffman;] 1835. The Old World and the New, or a Journal of Reflections and Observations, made in a Tour in Europe, by Orville Dewey; 1836. Sketches of Turkey in 1831–32, by Jas. E. De Kay; New-York, 1833. Incidents of Travel in Egypt, Arabia Petræa, and the Holy Land, by John L. Stephens; 1836. Incidents of Travel in Greece, Turkey, Russia and Poland, by the same; 1837. Journal of an Exploring Tour beyond the Rocky Modntains, 1835–37, by Samuel Parker; 1838. Incidents of Travel in Central America, Chiapas and Yucatan, by John L. Stephens; 1841. Biblical Researches in Palestine, &c. or a Journal of Travels in the year 1838, by Edward Robinson and Eli Smith, drawn up by E. Robinson; 1841. Letters from the Old World, by Mrs. Haight; New-York, 1840. Letters from Abroad, &c. by C. S. Sedgwick; New-York, 1841. Travels in England, &c. by J. Fennimore Cooper. Travels in Switzerland, &c. by the same. Travels in Europe, by Valentine Mott; 1842. The American in Egypt, with rambles through Arabia Petræa and the Holy Land, during the years 1839 and 1840, by James Ewing Cooley; 1842.

With regard to these works we may remark, that Schoolcraft's publications are among the best accounts of the western wilderness; that McKenzie's lively and graphic sketches of Spanish society have not been surpassed; Dr. De Kay's volume upon Turkey is replete with information valuable to the general reader as well as to the naturalist; that Hoffman is successfully creating a national taste for works descriptive of our own scenery, and illustrative of our own own history; the letters of Mrs. Haight, are written with vivacity and elegance; Stephens, Robinson and Dewey, forsook customary routes of travellers, and struck across the

deserts of Egypt to the land of Edom, and have laid open to our observation the city of the dead. Of the American travels of Stephens, and the noble spirit which prompts his researches into the antiquities of Central America, we could not speak with too high praise.*

In the department of classical learning, the state has one student preëminently distinguished, Charles Anthon of Columbia College. His fame is not only widely diffused throughout the United States, but his acquirements and labors are justly appreciated by the scholars of Europe. His critical and learned commentaries upon the works of the more popular classic authors are too familiar to need a reference. As the author of a classical dictionary, more accurate and extensive than any heretofore published, and as a diligent inquirer in the great department of the affiliation of languages, he has won for himself the highest rank among American classical scholars.

In the department of translations from modern languages, doctor A. Sidney Doane, distinguished for his writings upon medical subjects, has won for himself high reputation.

We are not altogether without historical romance. In this department may be mentioned Paulding's "Dutchman's Fire Side," Cooper's "Spy" and "Pioneers," and Hoffman's "Greyslaer." In other departments of fiction, the Sketch Book, Bracebridge Hall, the Conquest of Grenada, and other works by Irving; the numerous productions of Cooper, the writings of Paulding, the graceful romances of Theodore S. Fay, and Indian Sketches and the Hawk Chief, by John T. Irving junior, have been received with much popular favor: while in satire, Knickerbocker's History of New-York, by Irving; Salmagundi, by Paulding, Irving and others; the Bucktail Bards, by Duer, Bonner and Verplanck; and the Essays of Croaker & Co. by Drake, Halleck and Clinch, are very agreeable productions.

It must be confessed that a popular taste for poetry has not yet been created.

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* Notes on History and Travels, were received from GEORGE FOLSOM, Esq.

We have no epic that has attained eminent celebrity; yet the less elaborate and the fugitive pieces, when collected, constitute a treasure not unworthy of public acknowledgment. Sacred song has seldom excelled the beautiful fragment commencing "Father of Light," written by William Livingston, in 1747. "Vice," a satire by Gulian Verplanck, which appeared in 1774, is distinguished for taste, elegance and irony. In 1778, Anne E. Bleecker published several fugitive pieces, of which "A Thanksgiving after escape from Indian perils," and some others are preserved. Anthony Bleecker, who contributed freely to periodical literature from 1800 to 1825, claims remembrance for an ode which assisted to make the wild and beautiful scenery of Trenton falls known to his countrymen. Our national lyric "The American Flag," "The Culprit Fay," and other poems, by J. Rodman Drake, will prove to succeeding generations, that this utilitarian age is sometimes illumined by brilliant imaginative genius. The refined sentiment and mellifluous measure of "Yamoyden," "The Dead of 1832," and "Weehawken," are relied upon to preserve the memory of the lamented Robert C. Sands. A. H. Bogart, author of an "Anacreontic," in imitation of Moore; Jonathan Lawrence junior, who has left among other poems, "The Clouds," "Look aloft," "Morning among the hills," and an "Ode to May;" William Leggett, author of an exquisite sacred melody, and elegiac verses entitled "Love's Remembrancer;" James G. Brooks, among whose remains are "Greece," "Joy and Sorrow," "An Ode to the dying year," and other unambitious and touching poems; Willis Gaylord Clark, author of many beautiful pieces, among which all American readers will remember as peculiarly characteristic of the author, "Mary, Queen of Scots," "The Burial place at Laurel hill," "The Early Dead," and "The Death of the Firstborn;" James Nack, in whom even the privations of speech and hearing could not repress the utterance of inspiration; John Rudolph Sutermeister, whose "Faded Hours" were prophetic of his early death; John B. Van Schaick, the writer of "Joshua commanding the sun and moon to stand still;" the sisters, Lucretia Maria Davidson and Margaret Miller Davidson; and Lucy Hooper, author of many beautiful poems, will

long be remembered as sweet minstrels, whose voices were hushed in an early grave. Since death disarms envy, we have spoken with freedom of these departed votaries of the divine art; but prudence, and a respect for contemporaneous opinion, exact more caution in our notice of living poets. Bryant, to whom is assigned the palm in philosophic, descriptive and didactic verse; Halleck, the versatile author of "Alnwick Castle," "Fanny," and "Marco Bozzaris;" Paulding, whose "Backwoodsman," may be regarded as a national poem; Charles F. Hoffman, whose "Vigil of Faith" is the fruit of early cultivated genius, and who has thrown the charms of poetry, as well as of romance, over our own almost unknown mountains and lakes; Alfred B. Street, known as the author of "Nature," "A Forest Walk," and "The Grey Forest Eagle;" Edward Sanford, author of the spirited "Address to Black Hawk;" Peter H. Myers, author of "Ensenore;" George W. Doane and William Croswell, writers of sacred lyrics; Theodore S. Fay, John Inman and Park Benjamin, not unsuccessful in poetry, though engaged in other fields of literature; James O. Rockwell, author of "The Lost at Sea;" Samuel Woodworth, writer of a touching effusion, "The Old Oaken Bucket," which our domestic affections will not permit to lose a place in our literature; Elizabeth F. Ellet, author of "The Daughter of Herodias;" Mary E. Brooks and her sister, Mrs. Hall, known to our readers as Norna and Hinda; and Emma C. Embury, who has given us the chaste and affecting verses entitled "Christ in the Tempest;" all are writers whose fame is cherished by the generous and refined portion of the American community.*

The history of the fine arts in New-York, unfortunately, is scarcely more than an account of a controversy concerning the manner of promoting them. The American Academy of Fine Arts was established in the city of New-York in 1800, and was incorporated in 1808, with liberal legislative patronage. Among the founders of the institution, were Robert R. Livingston, John R. Murray, De Witt Clinton, Charles Wilkes, Fobert Fulton, William Cutting, Edward Livingston, Rufus King, David Hosack, and James Fairlie. The object of the

* Notes on Literature were received from CHARLES F. HOFFMAN, Esq., and ALFRED B. STREET, Esq.

association was to combine influence and patronage in favor of the fine arts. Addresses were delivered at the annual exhibitions of the academy. Of these, the discourse of De Witt Clinton in 1816, and that pronounced by Gulian C. Verplanck in 1824, are very valuable contributions to our literature. Many of our artists conceived the opinion that the objects of the society would be better promoted by an association, conducted by professional individuals, than by the academy, the operations of which were mainly conducted by patrons. Hence arose, in 1825, the National Academy of Design, the members and officers of which are artists. This association, under the presidency of Samuel F. B. Morse, has procured valuable collections in both the antique and life schools; and its usefulness has been signally manifested in the gratuitous instruction it has imparted to more than four hundred students. In the mean time, the Academy of Fine Arts has ceased to exist. Its place, however, is well supplied by the Apollo Association, consisting of both artists and patrons: an institution which cheers and encourages genius, without incurring jealousy or censure.

Painting, engraving and sculpture were scarcely known here before the revolution. William Dunlap, a painter of considerable merit, has shown in his curious and interesting history, that West and Coply, in their early years, executed some portraits in the city of New-York; but the state cannot lay claim to any honor from the birth, education or fame of these distinguished men. Peter R. Maverick, an engraver, in 1783, found insufficient occupation, although he seems to have enjoyed a monopoly in the business of his profession. In about 1794, Cornelius Tiebout engraved some portraits on copper. Andrew Anderson, of New-York, introduced wood engraving in 1794.

We need scarcely remark, that although we are very far from having established an American school, and although we confess our inferiority not only to the ancient masters but to modern European artists, yet the genius of our citizens has applied itself to the study of the arts with all the assiduity and zeal which mark the national character, and their success in that department may be expected to increase as rapidly as national taste and patronage will permit.

All artists and amateurs in our country concede the palm to Peter Vanderlyn, among whose performances will be remembered his "Ariadne" and his "Washington."

Music was long since admitted in every plan of female education; but owing to a strange perverseness, has been almost universally neglected in the education of the other sex. Just sentiments, however, are beginning to prevail. Elementary instruction is now given in many of our primary schools, and it may reasonably be hoped that soon there will be none in which this tasteful and refining art will be omitted.

It remains to notice the progress of the physical sciences. The notes on these subjects will be the more brief, because they are fully investigated in the work which follows this introduction.

The earliest publication relating to the botany of New-York, was Cadwallader Colden's account of the indigenous plants of Orange county and its vicinity, published in 1744. It is contained in the "Acta Societatis Regiæ Scientiarum Upsaliensis," and fills two quarto volumes. The catalogue embraced several hundred species, which were carefully described. The "Plantæ Coldenhamiæ" were frequently quoted by Linnæus. The traveller Kalm, who visited this country in 1747, under the patronage of the Swedish government, collected a large number of plants and transferred them to his preceptor Linnæus, by which distinguished naturalist they were described in the "Species Plantarum" and "Systema Vegetabilium." Wangenheim, a Hessian surgeon in the British army, during the American revolution, collected many plants in New-York, and in other portions of the United States, of which he published accounts in 1781 and 1787. The Michaux, elder and junior, travelled in New-York in 1792 and in 1803. The former published in Paris, in 1803, the "Flora Borealis Americana." The latter, in 1810 and subsequent years, gave a description of our indigenous forest trees, in his splendid work entitled "Arbres Forestiers de l'Amerique Septentrionale." C. W. Eddy of New-York, published in the "Medical Repository," in 1806, a catalogue of the plants growing about Plandome on the

northern side of Long Island, in which several new species were mentioned. In 1811, John Le Conte published in the "American Medical and Philosophical Register," a list of four hundred and sixty-eight plants growing on the island of New-York. A catalogue of plants indigenous in the state of New-York, was published in 1814, by Jacob Green. Frederick Pursh explored portions of the state, and incorporated the results of his examinations in his valuable work entitled "Flora Americæ Septentrionalis," published in 1814. Nuttall, author of the "Genera of North American Plants," and other learned works relating to the botany of this country, has materially aided in perfecting the flora of the state. In 1817, the "Lyceum of Natural History" in New-York, appointed a committee to prepare a catalogue of the plants growing within thirty miles of the metropolis. The duty was performed by John Torrey, M.D., and the results published at Albany in 1819. The localities, times of flowering, synonyms and characteristics of new species, were included in the account. Amos Eaton, in 1818, published his "Manual of Botany for the Northern and Middle States." This work has passed through eight editions, the last of which was greatly enlarged, and appeared under the title of "North American Botany." The great circulation which this book has obtained, is a gratifying evidence of increasing interest in this useful department of natural history. Doctor Torrey published in New-York, in 1823, a volume designed to be a part of a series entitled "Flora of the Northern and Middle States." The work comprised only the first twelve classes of the Linnean system, and the author then relinquished his purpose under a conviction that he would better advance the cause of science by adopting the natural method, and by describing the flora of the whole of North America.

The "Botany of the Northern and Middle States" was published by doctor Lewis C. Beck in 1833, and has greatly contributed to the advancement of accurate botanical knowledge. James Hall and John Wright published, in 1836, a catalogue of plants growing in the vicinity of Troy. This work forms a useful manual for persons pursuing the study of botany in the valley of the Hudson, and contains the names of most of the plants indigenous in the river counties

north of the Highlands. Doctors John Torrey and Asa Gray have been many years engaged in collecting and preparing materials for a complete "Flora of North America." The first volume of their work, comprising the polypetalous division of the dicotyledonous or exogenous plants, was published at intervals between 1838 and 1840. The authors adopt the natural system, and the work has been executed in a manner entirely in harmony with its high design. Besides these more elaborate works, other contributions to botanical science have appeared from time to time in scientific journals. Among these we refer to papers in "Silliman's Journal," by doctor Gray, David Thomas and others; descriptions of new and rare plants in the state of New-York, by doctor Gray, published in the "Annals of the New-York Lyceum of Natural History;" catalogues of the indigenous plants of particular counties or towns, printed in the reports of the regents of the university; and especially papers by professor Dewey and doctor Knieskern, contained in the last annual report. Many valuable papers on practical botany, and its relations to agriculture, are to be found in agricultural journals.

The science of zoology in this state owes its origin to Samuel L. Mitchill, who, in 1813, commenced, and in the succeeding year completed, an elaborate account of the fishes of New-York. This paper was given to the public in the "Transactions of the Literary and Philosophical Society of New-York." The work, although strictly local, and limited chiefly to a description of the fishes found in the waters in the vicinity of the city of New-York, became a standard of reference and comparison for succeeding laborers in the field of ichthyology. That science not only received from the labors of doctor Mitchill a great impulse, but its votaries here won for themselves regard from the savans of the old world, and were encouraged to persevere in their labors, even under disadvantageous and almost discouraging circumstances. To that impulse may be attributed the formation of the "Lyceum of Natural History" in the city of New-York in 1818. In connection with this department of natural history, it would be unjust to pass without notice the efforts and researches of De Witt Clinton, who, although engrossed in public duties, devoted himself with assiduity to the

pursuit of natural science, and especially to the study of natural history. The results of some of his investigations are contained in a letter to doctor Mitchill, published in the "Transactions of the Literary and Philosophical Society."

Although the study of ornithology has not been pursued with the especial object of determining the species of birds indigenous in the state, still in the comprehensive treatises which have issued from the press, there is no deficiency of information on that interesting subject. The labors of Wilson, Bonaparte, Audubon, Cooper and De Kay, in this department, are too well known to require more than a reference on this occasion.

Similar remarks apply to the history of the mammalia of the state. Although investigations in that department have been made by many distinguished individuals, none have confined their observations to species peculiar to the state, except William Cooper, who has published a treatise of the "Cheiroptera of New-York." Bachman, of South Carolina, in researches extending over most of the states, has made interesting discoveries in the families of many smaller quadrupeds in this State.

The reptile species, particularly the Tortoise, was described by Le Conte, in the "Annals of the New-York Lyceum," in 1829. His paper contains descriptions of seventeen species of tortoises, although only a small number of them belong exclusively to New-York.

Barnes, whose early death was deeply lamented, devoted himself to the study of the Unionidæ of our lakes and rivers. His descriptions were accurate, and may be considered as the first successful attempt to classify the numerous species of this family of Mollusca. They were published in the "American Journal of Science." For a knowledge of the mollusca of our seacoast, we are indebted to doctor Jay of New-York. Professor Bailey, of West-Point, has also published very interesting results of his researches among the living Infusoria.

The investigations made in meteorology by our scholars deserve marked acknowledgments. They seem to have begun under an impulse which that science received in 1780, from the Meteorological Society of the Palatinate (in

Germany), under the patronage of the elector Charles Theodore. Simeon De Witt, who appears often in this memoir as a friend of science, published in 1792 a "Plan of a Meteorological Chart for exhibiting a comparative view of the climate in North America, and the progress of vegetation." This plan contained suggestions which have since been found useful, but we are not informed what portion of them was original. Mr. De Witt, Gardner Baker, Jonathan Eights and John Griscom contributed, from 1795 until 1814, very useful papers in this department, which were published in the Transactions of the Society for the Promotion of Agriculture and the Useful Arts. In March, 1825, the regents of the university, on the motion of Mr. De Witt, adopted the system in pursuance of which the academies have since that time made daily observations upon the weather and the winds, together with notices of the progress of vegetation, and the occurrence of remarkable atmospheric phenomena. T. Romeyn Beck, Joseph Henry, professor Ten Eyck, Benjamin F. Jocelyn, W. C. Redfield, Matthew Henry Webster, Charles Dewey, James H. Coffin, and others, have assiduously collated the facts obtained by academical and other observations, and the success of their labors has received the praise of transatlantic as well as American philosophers.*

Dr. Franklin's experiments proving the identity of electricity and lightning, signalized the commencement of American chemical science. A chair of chemistry was established in the medical school founded in New-York before the revolution; and the science received a new impulse from the labors of Dr. Priestley, who, driven by popular bigotry and violence from his own country, renewed his learned studies in his retreat at Northumberland in Pennsylvania. It was not, however, until after the commencement of the present century, that the importance of chemistry was fully appreciated on either side of the Atlantic.

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* Notes on Chemistry and Mineralogy were received from Lewis C. Beck, M.D.; Notes on Meteorology, from T. Romeyn Beck, LL.D.; Notes on Scientific Societies, from Horace B. Webster, Esq.; Notes on Natural History, from John W. Francis, M.D.; Notes on Zoology, from Ebenezer Emmons, M.D.; Notes on Botany, from John Torrey, M.D.; and Notes on Geology, from James Hall, A.M., and L. C. Beck, M.D.; and Notes on the Progress of Knowledge, from Samuel Blatchford, Esq.

and in this state it was not admitted to a place in collegiate education until 1813, when it was introduced at Union College. Since that time no faculty of arts or of medicine has been considered complete without a professorship of chemistry, and it is now very generally taught to pupils of both sexes in academies and in many of the common schools.

The trustees of the Albany Academy are entitled to the praise of first introducing chemistry into our seminaries of that grade. The more popular experiments in electro-magnetism began in that institution with the construction of an electro-magnet capable of sustaining a weight of several hundred pounds. Our chemists have not been inactive, although their studies have been crowned with no brilliant discoveries, and their very useful papers will be found in most of the scientific journals in the country.

Few subjects in this department are more intricate in their nature than the minute analysis of mineral waters. The mineral springs at Ballston, Saratoga, Avon, Sharon, Massena and other places, have elicited memoirs embracing details of their chemical constituents, as well as essays on their respective sanative qualities. The springs at Ballston and Saratoga have acquired extensive reputation, from the publications of Seymour, De Witt and Steele. Francis, Hadley and Salisbury have made known the virtues of those at Avon. The waters at Sharon have been subjected to chemical analysis by Chilton; and Dr. McNeven's publications on the waters at Schooley's mountain, have conferred upon them much celebrity.

Mineralogy, although intimately connected with geology, was cultivated long before the latter grew into a distinct branch of knowledge. To the late Samuel L. Mitchill belongs the honor of introducing mineralogy in this state. The first and second volumes of the Medical Repository, published in 1798 and 1799, contain his sketch of the mineralogical history of the state of New-York, which, although meagre when compared with our present knowledge, shows that diligent investigation of facts had commenced. In the latter year a mineralogical society was formed in New-York under his auspices, with the efficient aid of Samuel

Miles Hopkins and George I. Warner. And the ardor of Dr. Mitchill's zeal is illustrated in his description of the object of the association, which he said "was to arm every hand with a hammer, and every eye with a microscope." The Medical Repository, from 1803 to 1809, and the Transactions of the Society for the Promotion of Useful Arts, from 1793 until 1804, contained many papers which contributed to excite the general interest now manifested in the study of the science. Among these we may specify a "Memoir of the Onondaga Salt Springs, and Manufactures in the State of New-York, by Benjamin De Witt;" "Observations on the Natural History of Kinderhook and its immediate vicinity, by David Warden," in 1803; "Mineralogical Description of the Walkill and Shawangunk Mountains in New-York," by Samuel Akerly; "Descriptions of Fluate of Lime and Oxyde of Manganese in the State of New-York," in 1808; and "Mineralogical Notices of Onondaga, New-York," 1809. But the effort which proved most successful in this department, was the establishment of the American Mineralogical Journal in 1810, conducted by Archibald Bruce. This work was continued until 1814, and was enriched by the learned investigations of Mitchill, Bruce, Akerly, Chilton, John Griscom, Benjamin Silliman, David R. Arnell and others.

An address by T. Romeyn Beck, before "The Society for the Promotion of Useful Arts," on the mineralogical resources of the United States, published in 1813, exhibited a very full view of the mineral productions within the state known at that time. Professor Cleveland's elementary treatise on mineralogy and geology, published in 1816, is still a standard work. Dr. Mitchill, in 1818, published a reprint of Phillips' elementary introduction to mineralogy, with notes. Professor Silliman, in the same year, established the "American Journal of Science," which most useful periodical is still continued. Mineralogy has always held a prominent place in that journal, and it contains many valuable papers, showing the progress of the science in this state. The Lyceum of Natural History, established in New-York in 1818, and a similar institution founded at Albany, contain rich collections of minerals. The latter, through the liberality

of Stephen Van Rensselaer and William Caldwell, has acquired a library which contains almost every important work in the department of natural science. From the period when the geological survey commenced, the progress of mineralogy has been identified with that of geology, and the present condition of that science will appear in that portion of the following work devoted to the subject.

The history of geology in this country commences with the year 1807. William McClure, a native of Scotland, who had emigrated to the United States, revisited Europe in 1803. Imbued with a love for the study of natural history, and possessing ample fortune, he traversed large portions of Europe, acquiring geological knowledge. Prepared by these researches, he undertook, on his return to this country in 1807, at a time when scientific pursuits were little appreciated, to accomplish by his own enterprise a geological survey of the United States. His observations were made in almost every state and territory in the union; and not only in populous districts, where the comforts which the traveller requires were afforded, but also in forests and dreary solitudes, unaffected by all the privations to which he was exposed. The unlettered inhabitants of remote districts, seeing him engaged in breaking fragments from rocks, supposed him to be a lunatic escaped from confinement. The facts which he accumulated, were communicated to the American Philosophical Society, and published in their "Transactions" in 1809. The author continued his investigations during a series of many years. But in pursuing his valuable discoveries, he, like his successors, was influenced not so much by a desire to obtain a correct classification of our strata, as to identify them with those of the eastern continent. The publication of Mr. McClure called into the field a few laborers, and engaged the attention of friends of science. De Witt Clinton, in his Introductory Discourse, delivered in 1814 before the "Literary and Philosophical Society of New-York," censured the legislature for having refused, at a recent session, to lend its aid to the prosecution of searches for coal within this state; and in considering the objects worthy the attention of that association, he remarked that "Men of observation and science ought to be employed to explore our country,

with a view to its geology, mineralogy, botany, zoology and agriculture." The "American Journal of Science," the "American Monthly Journal of Geology," by Mr. Featherstonhaugh, and the transactions of scientific associations in Pennsylvania, New-York and Massachusetts, were very efficient in enlightening the public mind concerning the importance of mineralogy and geology. A board of agriculture having been established by the legislature, under the recommendation of De Witt Clinton, he proposed in his annual message, in 1819, that that board should be authorized to make a statistical survey of the state, and describe its animal, vegetable and mineral productions. Not at all doubting that coal would be found to compensate for the waste of fuel in the western portion of the state, then destitute of facilities for communication with the Atlantic coast, he urged that premiums should be offered to promote a search. Private liberality, however, anticipated this recommendation. Stephen Van Rensselaer, in 1820, authorized Amos Eaton and T. Romeyn Beck to make an agricultural and geological survey of the county of Albany. The result of their examination was a description of the rocks and minerals of the county, with an analysis of a variety of soils, together with remarks upon the condition of agriculture. In the succeeding year, professor Eaton, with the same liberal patronage, completed a similar survey of Rensselaer county. In 1823, the liberality of Mr. Van Rensselaer took a wider range, and professor Eaton was authorized to extend his survey throughout the region traversed by the Erie canal. His report proposed a general geological nomenclature, and contained a description of the strata extending from Boston to Buffalo. This publication marked an era in the progress of geology in the country. It is in some respects inaccurate, but it must be remembered that its talented and indefatigable author was without a guide in exploring the older formations; and that he described rocks which no geologist had, at that time, attempted to classify. Rocks were then classified chiefly by their mineralogical characters, and the aid which the science has since learned to derive from fossils in determining the chronology and classification of rocks, was scarcely known here, and had only just begun to be appreciated in Europe. We

are indebted, nevertheless, to professor Eaton for the commencement of that independence of European classification which has been found indispensable in describing the New-York system. For he remarks, "After examining our rocks with as much care and accuracy as I am capable of doing, I venture to say that we have at least five distinct and continuous strata, neither of which can with propriety take any name hitherto given and defined in any European treatise which has reached this country." Connected with the report there was a view of the section of the rocks extending in the line of the canal through the state, and another from the Atlantic ocean to Pittsfield in Massachusetts, for the latter of which we are indebted to Edward Hitchcock, who has since completed a geological survey of Massachusetts, under the direction of the government of that state. Professor Eaton enumerated nearly all the rocks in western New-York, in their order of succession; and his enumeration has, with one or two exceptions, proved correct. It is a matter of surprise that he recognized, at so early a period, the old red sandstone on the Catskill mountains; a discovery, the reality of which has since been proved by fossil tests. Had he followed up this discovery, he could not have failed to learn what an immense series of rocks lay below the old red sandstone, at that time entirely unclassified.

The munificence of Mr. Van Rensselaer, in producing such results, is illustrated by this remark addressed to him in professor Eaton's report: "You have furnished every facility for perfecting the work. You have set no limits to my expenses, nor those of the engravers and printers." The public mind was now becoming prepared for the state surveys which have since been effected. North Carolina has the honor of having been the first to send geologists into the field. Professor Olmstead's report upon the economical geology of that state was published in 1825. Since that time, South Carolina, Massachusetts, Tennessee, Virginia, Maine, Rhode Island, New-Hampshire, Connecticut, Pennsylvania, Ohio, Delaware, Kentucky, Georgia, Arkansas and Iowa, and perhaps other states and territories have been explored. In 1835, the assembly of this state, upon the motion of Charles P. Clinch, a representative from New-York, passed

a resolution directing the secretary of state to report to the legislature, at its next session, the most expedient method for obtaining a complete geological survey of the state, which should furnish a perfect and scientific account of rocks and soils and their localities, and a list of all its mineralogical, botanical and zoological productions, and for procuring and preserving specimens of the same, with an estimate of the expense of the undertaking. John A. Dix, secretary of state, in January, 1836, submitted a report in pursuance of this resolution. That luminous and satisfactory document led to the passage of the act of the 15th of April, 1836, in the execution of which, and of the acts of May 8th, 1840, and of April 9th, 1842, the survey has been made.* William L. Marcy, governor, arranged the plan of the survey in the summer of 1836, and assigned its departments as follows: The zoological department to James E. De Kay; the botanical department to John Torrey; the mineralogical and chemical department to Lewis C. Beck; the geological department to William W. Mather, Ebenezer Emmons, Timothy A. Conrad, and Lardner Vanuxem. This arrangement was subsequently altered by the institution of a palæontological department, under the care of Mr. Conrad, and by the appointment of James Hall to supply his place as a geologist. The results of the survey appear in the following volumes, and in eight several collections of specimens of the animals, plants, soils, minerals, rocks and fossils, found within the state, one of which collections constitutes a museum of natural history at the capital of the state, and the others are distributed among its collegiate institutions.

It cannot be necessary to dwell upon the benefits secured by the survey. It is not more necessary to know what resources are withheld from us than to understand those which Providence has been pleased to bestow. In regard to the narrow purpose in which the survey originated, it is no unprofitable result to know that coal cannot be found within the state, and that we must depend for supplies of that mineral on trade with the countries with which we are connected.

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* It may be stated with just pride, that the law of 1836, appropriating the sum of $104,000 to the survey, was passed by the assembly unanimously. A further appropriation of $26,000 was made by the law of 1842.

The want of coal, however, is compensated by the discovery of rich deposits of salt, lime, marl, peat and gypsum, and of plumbago, copper, zinc, lead and iron. The field within which economical science has recently pursued its investigations, with results so well calculated to exalt our sentiments of wonder, gratitude and devout veneration, and so propitious to the future welfare and happiness of our race, is greatly enlarged, and many obstructions to those investigations are removed. Although thus far the survey has resulted only in adding accumulations to the mass of facts already acquired, yet even that is no unworthy contribution to human knowledge; and it may be hoped that a spirit of inquiry has been stimulated, which will not rest content until that philosophical classification of facts shall be made, which is necessary to enable us to read with accuracy the imperishable pages on which the physical history of the earth is written. What new light the discoveries, thus to be made in cosmogony, will throw upon the designs of the Creator and the destiny of our race, cannot now be conjectured; but it is enough to stimulate and reward our highest efforts, to know that while the range of research is infinite, the human mind is perpetually progressive.

In submitting to the people of New-York the results of the scientific survey, conducted under their patronage, it has been thought proper and even necessary to record the incidents connected with the origin and progress of that enterprise; and since it is a national characteristic to be careless in regard to the preservation of memorials of our social progress, the occasion has been deemed a proper one for collecting from various sources some facts, which might illustrate the advance of civilization and refinement within our limits. The review which has been taken of that progress, comprehends a geographical and political description of the state: a sketch of the history of education, of the system of public instruction in colleges, academies and common schools, and of the foundation and endowment of libraries; a history of the press; a notice of the theological profession, with a sketch of theological learning; an account of medical science and the medical pro-

fession; a political history of the state, from the time of the Dutch colonial government to the revolution; a notice of the establishment of the constitution of 1777; an account of the formation and establishment of the constitution of the United States, and of the organization and early administration of the federal government, so far as concerns the action of this state and of its citizens; notices of the abolition of slavery, of the amelioration of the criminal code, and of the progress of jurisprudence, with an account of the judiciary and of the legal profession; a reference to contributions by citizens of New-York to political and financial science; accounts of the formation of the constitution of 1821, and of the codification of our statute laws in 1827 and 1828; a history of internal improvements within the state, from the period of their conception, which, as constituting a peculiar and interesting feature in our physical progress, have been deemed worthy of extended and detailed remark; accounts of the improvement and present condition of agriculture, of the development of agricultural science, and of the introduction of horticulture; a sketch of civil engineering, with a full description of the recently constructed Croton aqueduct; notices of the application of the steam engine to navigation, and of improvements in the steam engine; of sacred, civil, academic and domestic architecture; of antiquarian curiosities, and of Indian history; of the materials collected for the history of the state; of the studies and productions of our citizens in the departments of history, classical learning, mathematical science, pure and mixed biography, travels, romance and general literature, poetry and the fine arts; and of researches in our zoology, botany, meteorology, chemistry and mineralogy; with an account of the inception, progress and consummation of the survey, to which those researches gave birth.

This review, although circumscribed and imperfect, furnishes gratifying proof that a republican government is not unfavorable to intellectual improvement. Intelligent and patriotic citizens were invited to furnish the materials necessary for the work, and portions of it consist substantially of such materials, in the

form in which they were received, little labor having been bestowed upon them beyond that of compilation. The laudable objects of those citizens, as well as my own design, will have been attained, if any thing valuable shall be preserved which would otherwise be lost; if the attachment of our citizens to the state and its institutions shall be increased and confirmed, or if any new incentives shall be furnished for perseverance in the career which is here recorded.

WILLIAM H. SEWARD.

Albany, 1842.

NOTE.

[The subject of the penitentiary discipline in the state of New-York, is too important to be passed with only such very general reference as could be made to it in the foregoing introduction. The following account was furnished by the Hon. JOHN L. O'SULLIVAN.]

THE Penitentiary System of New-York, as it has now existed for a period of nearly a quarter of a century, has presented one of the institutions of the state which have been the subject of the highest interest to the stranger and pride to its own citizens. The two great establishments in which it is to be seen in operation, on a larger scale than in any of the other states of the union, are situated at the villages of Auburn and Sing-Sing; the former for the reception of convicts from the western, the latter from the eastern district of the state. The Mount-Pleasant prison, at Sing-Sing, on the Hudson, about thirty-three miles north of the city of New-York, has also a separate building for the reception of female convicts from the whole state. The former of these establishments, at the village of Auburn, in the county of Cayuga, situated 169 miles west of Albany, and 139 east of Buffalo, and about seven miles south of the line of the Erie canal, was the first in the union in which the peculiar system now prevailing in both was adopted, or at least carried out to that degree of completeness and efficiency, which has become the just subject of the admiration of the civilized world. It has, therefore, given its name to the system, notwithstanding that its leading features were by no means novel to the science of prison discipline, or original with the founder of this institution. It has constituted the model from which most of the other states of the union have derived the plans of the penitentiaries which most of them have, of late years, been led to establish, under the stimulus of an example so successful in itself and so honorable in the eyes of the world; and in the vehement controversy which has been waged, through many modes of publication, between the respective partisans of this system and of the rival system in operation in the state of Pennsylvania, it is always and every where designated as *the Auburn system.* A brief sketch of its origin, as well as of its present condition, will not be deemed misplaced.

Previously to the year 1786, the different states of this union were governed, in the main, by the sanguinary criminal code which all as colonies had inherited from their mother-country. In that year, Pennsylvania, in which had been more widely sown than in any other the seeds of that philanthropic wisdom which so peculiarly marked the character of its immortal founder, as well as of the religious communion of which he was an ornament, was the first to lead the

way to her sister republics in the direction of reform in criminal law and penal discipline. A new criminal code was created, the most interesting feature of which was the abolition of the former barbarism of capital punishment, for all offences short of the highest felonies, treason, murder, rape and arson. In a few years, under the auspices of such intellects and such hearts as those of a Benjamin Franklin, a Benjamin Rush, a William Bradford and a Caleb Lowndes, a still further amelioration took place. The year 1790 was marked by important mitigations of the former corporeal severities inflicted; and in 1794, the penalty of death was restricted to the single crime of murder in the first degree. The first penitentiary erected in the state was the Walnut-street prison in Philadelphia, in the year 1790; in which imprisonment at hard labor was substituted for the ancient modes of punishment for crime by the gallows, the lash, and the brand. A certain degree of classification was adopted for prisoners, according to their offences and characters; while solitary cells were provided for those who, for the more heinous grades of crime, were condemned to that penalty, as also for those whose violent resistance to the ordinary discipline of the prison required unusual means of restraint or punishment. The solitary cells were without the provision of labor, which in the other portions of the establishment was designed to afford one of its chief reformatory influences.

New-York was not slow to follow in the track of a more enlightened penal policy, in which Pennsylvania thus bore off the honor of leading the way. The year 1796 marks the first prominent era in the history of penitentiary reform in this state. In his first message to the legislature, on the 6th January, Governor Jay recommended the mitigation of the criminal code, and the erection of establishments for the employment and reformation of criminals. Two years previously, two citizens of New-York, distinguished for their humanity and liberality, Thomas Eddy, of the Society of Friends, and General Schuyler, alike in peace and in war, one of the most illustrious of the founders of this commonwealth, had visited the Philadelphia prison for the purpose of acquiring a more accurate knowledge of its tendency, structure, and its internal arrangements; and so favorable was the impression produced on their minds, that the latter gentleman, who was then in the senate of the state, immediately drafted a law for the erection of a penitentiary in the city of New-York. This bill, "for making alterations in the criminal law of this state, and the erecting of state prisons," in harmony with the recommendation of the governor, was brought forward in the senate, and ably and successfully sustained by Ambrose Spencer, the subsequent eminent chief justice of the state, and finally became a law on the 26th of March, 1796. This law directed the establishment of two state prisons, the one at Albany and the other at New-York; though the idea of the former was afterwards abandoned, and the whole appropriation expended in New-York, under a commission consisting of Matthew Clarkson, John Murray junior, John Watt, Thomas Eddy and Isaac Stoutenburgh. This establishment (known as Newgate) was opened for the reception of its inmates on the 25th of November, 1797. The building was 204 feet in length, a wing projecting from each end, and from those wings two other smaller wings. The whole structure was of the Doric order, containing 54 rooms, 12 feet by 18; besides the cells for

solitary confinement, on the ground floor. Criminals sentenced to imprisonment had heretofore been simply confined in the jails of the counties in which they were convicted. The law of 1796 effected at the same time an important amelioration in our criminal code. Previously to that period there were no less than sixteen species of crime punishable with death. Corporeal punishment was used, and in many cases felonies which were not capital on their first, became so on their second commission. In fourteen of these offences, imprisonment for life, or for shorter periods, was substituted for the capital penalty, which was only retained for treason and murder. The model afforded by the Philadelphia and New-York prisons was soon successively imitated by other states. The state prison at Richmond, Virginia, was erected in 1800; that at Windsor, Vermont, in 1808; at Baltimore, Maryland, in 1811; at Concord, New-Hampshire, in 1812; and at Cincinnati, Ohio, in 1816.

But this system, the object of so much sanguine hope to its philanthropic projectors, was no where crowned with success. It is in the state of New-York in particular, that we are here to regard its operation. The great body of the convicts were thrown together in the prison, in numbers which soon became improperly crowded, and were kept at work through the day. The only punishment which their keepers had a right to inflict for violations of the discipline, was solitary confinement with bread and water. A small proportion of them, who before the reform of the penal laws would have been sentenced to death, were confined in perpetual solitude, unrelieved by the solace of labor. The system was found not only totally ineffective to reform, but on the contrary most perniciously active to corrupt and to harden. It was an enormous drain on the public treasury. It soon ceased to have any terrors for the depraved; while to young offenders thrown for the first time into the midst of the polluted atmosphere and the fatal society assembled in the rooms of the prison, it was certain and irrecoverable ruin. And partly from the increase of population, but in probably a still greater degree from the tendency of the system itself to manufacture new rogues and to continue old ones, it became so overstocked, as soon to make it necessary annually to pardon out large numbers of offenders for no other reason than to accommodate the reception of the fresh influx. Though adapted to the suitable accommodation of not more than between three and four hundred, it was at times occupied by upward of seven hundred—crowded and herded together beyond any possibility of proper classification. A report made to the legislature in 1817, by commissioners appointed to examine into the subject, stated that, within a period of five years, 740 had been pardoned, while only 77 had been discharged by the expiration of their sentences. In the two years, 1816 and 1817, the number of pardons was 573. A report made to the senate in 1822, by the Hon. Samuel Miles Hopkins, states the whole number of convicts committed since 1796 to have been 5,069, of which number there had been pardoned not less than 2,819. The necessary effect of such a system to promote the multiplication of crime, need scarcely be adverted to. It will be sufficient to state, that of twenty-three convicted of second and third offences in the year 1815, twenty had been previously pardoned, and only three discharged by the ordinary course of law. The average number of deaths was about seven per cent. Fires and insurrections were of not unfrequent occurrence.

The first suggestion of the necessity of another penitentiary in the interior of the state, was made in the annual report of the officers of the prison in 1809. The friends of the existing system, notwithstanding the annually developed evidence of its total failure for every other than the worst purposes, still clung to their old ideas; and the admitted evils, manifest in the existing establishment, being ascribed to its crowded condition, when the erection of a second prison, at the village of Auburn, was determined upon in 1816, it was hoped that ampler space of accommodation, and smaller subdivisions of numbers, would yet produce the salutary results originally expected. The south wing of this building was completed in 1818; containing sixty-one double cells, and twenty-eight rooms. Each of which was to contain from eight to twelve prisoners. But for reasons obvious to those at all familiar with the vicious tendencies of imprisoned convicts, this plan was soon found to be the most fatal that could be adopted; and it was evident that it would be better to throw fifty criminals together in the same room, than to divide them in small numbers, and especially in pairs. The subject was much discussed at about this period, both in the legislature and the community at large; and in 1819 the erection of the north wing was ordered, to consist entirely of cells for solitary confinement. By a law of this year, too, for the first time the use of the whip was permitted when deemed necessary for the maintenance of the discipline of the prisons.

At about the same period the public attention in the state of Pennsylvania also was much engaged with the same subject. In the year 1817, the manifest failure of the old system, as prevailing in the Walnut-street prison, led to the passage of a law for the construction of the Western penitentiary at Pittsburgh, and in 1821 for the Eastern penitentiary at Cherry-Hill, near Philadelphia; in which it was determined to adopt entirely the system of uninterrupted solitary confinement. Desirous of making a similar experiment, the legislature of New-York, on the 2d April, 1821, directed the agent of the Auburn prison to select a number of the most hardened criminals, and to lock them up in solitary cells, night and day, without interruption and without labor; and in December of the same year, a sufficient number of cells were completed for the purpose, and eighty criminals placed in them.

The result of this experiment, which was founded on the recommendation of a committee of the legislature, was disastrous in the extreme. Human nature could not endure the solitary horrors of such a doom. Within the year, five of the eighty died; one became insane; another, watching an opportunity when his keeper opened his door for some necessary purpose, in a fit of despair precipitated himself from the gallery, running the almost certain chance of destruction by the fall; and the rest sank into a state of such deep depression, and of failing health, that their lives must have been sacrificed had they been kept longer in this situation. Under these circumstances the governor pardoned twenty-six, and the remainder were withdrawn from their cells during the day to work in the shops of the prison. From this period, 1823, this system of uninterrupted solitude was abandoned at Auburn.

The failure of this experiment for a time seemed to endanger the success of the whole penitentiary system. The ardent hopes of its friends were nearly exhausted; and even some, whose feelings revolted at the idea of capital punishment, began to fear that it would again become

necessary to resort to the more frequent use of the scaffold. But, as it is stated in a report by the late agent of the Mount-Pleasant prison, Mr. Robert Wiltse, made in March, 1834, (from which document we have already drawn considerably in the preparation of this narrative,) Capt. Elam Lynds, who was at this time the agent of the Auburn prison, was too wise to give up the idea that the beneficial moral influences of solitude might yet be combined with some successful system of congregated labor. He felt convinced that this result could be attained by a union of the two opposite principles—by confining the convicts to solitary cells at night and on Sundays, and compelling them to work during the day in large workshops in absolute silence, and under such a vigilant inspection as should preclude, so far as possible, all intercourse in any manner between them.

It has been a subject of some controversy, who was entitled to the credit of having originated this system; a point necessarily difficult to decide, when it is considered how naturally, during the progress of its experimental growth, the suggestions which might proceed informally from the various minds engaged in and about it, would flow into one general current of opinion, common perhaps to several. Capt. Lynds, having unquestionably been the first to complete, mature and execute the plan, has generally received from public opinion the credit of its invention; an honor which justice would probably require to be divided with Mr. John D. Cray, one of the master-workmen or architects employed in the construction of the building.

The experiment was tried. Capt. Lynds, a man of remarkable energy and firmness of character, who had formerly served in the army of the United States, and who retained all the habits of rigid and severe military discipline there to be acquired, assembled the convicts together, and giving them the rules by which their conduct must be governed, told them that they must henceforth labor diligently, and labor in perfect silence and non-intercourse; and that for every infringement of the rules, a swift and summary punishment should follow, of corporeal chastisement. This was soon proved to be no unmeaning threat, and in a short time, seconded by the able and unwavering exertions of his assistant-keepers, he succeeded in establishing this new discipline with a degree of efficiency scarcely conceivable to those who had not the opportunity of witnessing it. Inspected in 1824 by a committee of the legislature, a high eulogium was passed upon it, and it was sanctioned by the formal approbation of that body.

The *Auburn system*, therefore, in its mature and complete state, may be said to date from the year 1824.

But it was soon found that its adoption must render necessary the construction of another prison for the eastern portion of the state, that of Auburn containing, as it was enlarged in 1824, only 550 cells. An act was therefore passed to that effect on the 7th of March, 1824; under which three commissioners were appointed, Stephen Allen, Samuel Miles Hopkins and George Tibbits, to select a suitable site. The village of Sing-Sing, on the Hudson river, thirty-three miles from New-York, was selected, and a piece of ground purchased containing an inexhaustible quarry of white marble, which it was designed to make not only the material for the construction of the building by the hands of the convicts themselves, but also a profi-

table article on which their future labor should be employed for the benefit of the state. To Capt. Lynds, who had chiefly presided over the construction of the Auburn prison, as well as having performed the whole service of organizing its system of discipline and labor, was entrusted the charge of bringing forth the new establishment, as it were, out of the bowels of the earth. Were it possible to question its truth, as a literal historical fact, the manner in which he carried this into effect would be deemed incredible. According to his own plan, he was directed to take a hundred of the convicts from the Auburn prison, to remove them to the selected site, to purchase materials, employ keepers and guards, and make them commence the construction of their own future abode. The novel spectacle was exhibited on the 14th May, 1825, of the arrival of this band on the open ground which was to be the theatre of operations, without a place to receive, or even a wall to enclose them. The remarkable moral energy of the man effected it with a success which must always remain astonishing. The first day sufficed to erect a temporary barrack for shelter at night, and ever after they continued in unpausing labor, watched by a small number of guards, but held under perpetual government of their accustomed discipline, and submission to the power whose vigilent eye and unrelaxing hand they felt to be perpetually upon them and around them. It was finished according to the original plan, in 1829, containing 800 cells; to which 200 more were ordered to be added by an act of the following year. Another story being therefore raised for this purpose, the final completion of this vast and massive edifice, was in the year 1831. A sufficient number of cells having been completed in May, 1828, the convicts in the old prison at New-York were removed to Sing-Sing, and that building abandoned and sold.

In the year 1825, the legislature directed the erection of another building at Sing-Sing, adjacent to the main prison, though unconnected with it, for the reception of the female convicts, who heretofore had been kept together by the city of New-York, at its local prison establishment at Bellevue, at a cost to the state of $100 per annum for each prisoner. They were there in a miserable and disorderly state; that mode of maintenance being found replete with all the evils which it had been the object of the improved penitentiary system, as applied to the males, to reform. This was completed, in an elegant style of architecture, in 1840, and the convicts removed to it, and placed under the charge of a matron, whose admirable management soon brought them to a condition of good order, neatness and industry, before supposed impossible by those who had witnessed their former character and conduct.

It is unnecessary to fill the present pages with descriptions of these vast establishments of penitentiary labor, beyond a few simple general features common to both. The cells rise in tiers above each other to the height of five stories. These central structures are surrounded with an outer shell or envelope of a second wall, about eleven or twelve feet distant from the interior. Along the front of each range of cells runs a gallery. The size of the cells is seven feet in depth, by three and a half in width, and seven in height; all of stone, with iron doors, of an open diamond grating from top to bottom, for the combined objects of security, ventilation and light. To these buildings are attached spacious workshops, surrounding the large court-yards of the prisons, in which different branches of mechanical industry are pursued,

with the aid of machinery, in some instances on a very large scale; the whole being enclosed in high outer walls, vigilantly guarded by armed sentries. The convicts wear a peculiar striped prison uniform, of coarse woollen fabric, manufactured within the prisons. Their movements to and fro at the regular hours in the daily routine of the life of the prisons, are all made in single file, with the lock-step, and with the heads turned all in one direction, facing the constant eye of the keeper of each respective division, for the prevention of intercommunication. At Sing-Sing they eat their meals singly in their cells; at Auburn, in large eating halls, at tables at which they are seated back to back, and fronting only their keepers. The food is plentiful and healthy, though coarse. A scrupulous cleanliness reigns through every nook and corner of the establishments. The health of the prisoners is good; the average of deaths being about two per cent per annum. Each prison is provided with a chaplain, whose whole time is devoted to his interesting though arduous pastoral charge, and under whose direction they receive instruction on the Sabbath in Sunday schools. The cells have always been supplied with bibles; since the accession of the present executive of the state, and by his direction, other books have been added, suitably selected for instruction and moral improvement. For many years the establishments have not only defrayed the cost of their own maintenance, but have continued to earn annually a large excess to the benefit of the general revenues of the state. The mode employed of using the labor of the convicts is to let it out at certain rates per diem, for fixed periods, to contractors in the different branches of industry pursued.

The proper limits of the present occasion forbid the expansion of this brief account with any further details of the operation of the system, whose gradual growth has been thus related. As has been already remarked, the conflict of opinion between the supporters of the Auburn system, of social labor in silence by day, with solitary confinement by night, and the Pennsylvania system, of uninterrupted solitary confinement with labor, has been carried on with no small degree of both earnestness and ability. The advocacy of the Auburn system has been chiefly sustained by the Boston Prison Discipline Society, the annual reports of which have continued, from the institution of that society in 1825, to hold it up to the admiration and imitation of the world, in terms of unqualified eulogium. The prisons have been visited by many thousands of strangers, from foreign countries as well as from the other states of this Union, attracted by the celebrity which they have acquired; and even those whose preference has inclined in favor of the theory of the Pennsylvania system, have not failed to accord a high degree of praise to the many admirable features characterizing ours, as well as to the excellent management with which they have been practically administered. The following States have since erected penitentiaries for the most part in imitation of the model thus afforded: Maine, New-Hampshire, Vermont, Massachusetts, Connecticut, Maryland, Tennessee, Kentucky, Missouri, Illinois and Ohio; together with the two provinces of Upper and Lower Canada; not to speak of numerous city prisons and county jails.

We are far from desirous of pronouncing even an opinion in relation to this controversy. There are undoubtedly some features in the Auburn system which its best friends would

gladly see amended, if it could be done consistently with the efficient maintenance of the general whole of which these are particular parts; nor can it be pretended that the object of the prevention of intercourse between the convicts, by a thousand modes of communication beyond the reach of any degree of vigilance, either has been or ever can be attained, to the degree supposed by many who simply witness the apparent silence that reigns throughout the work-shops.

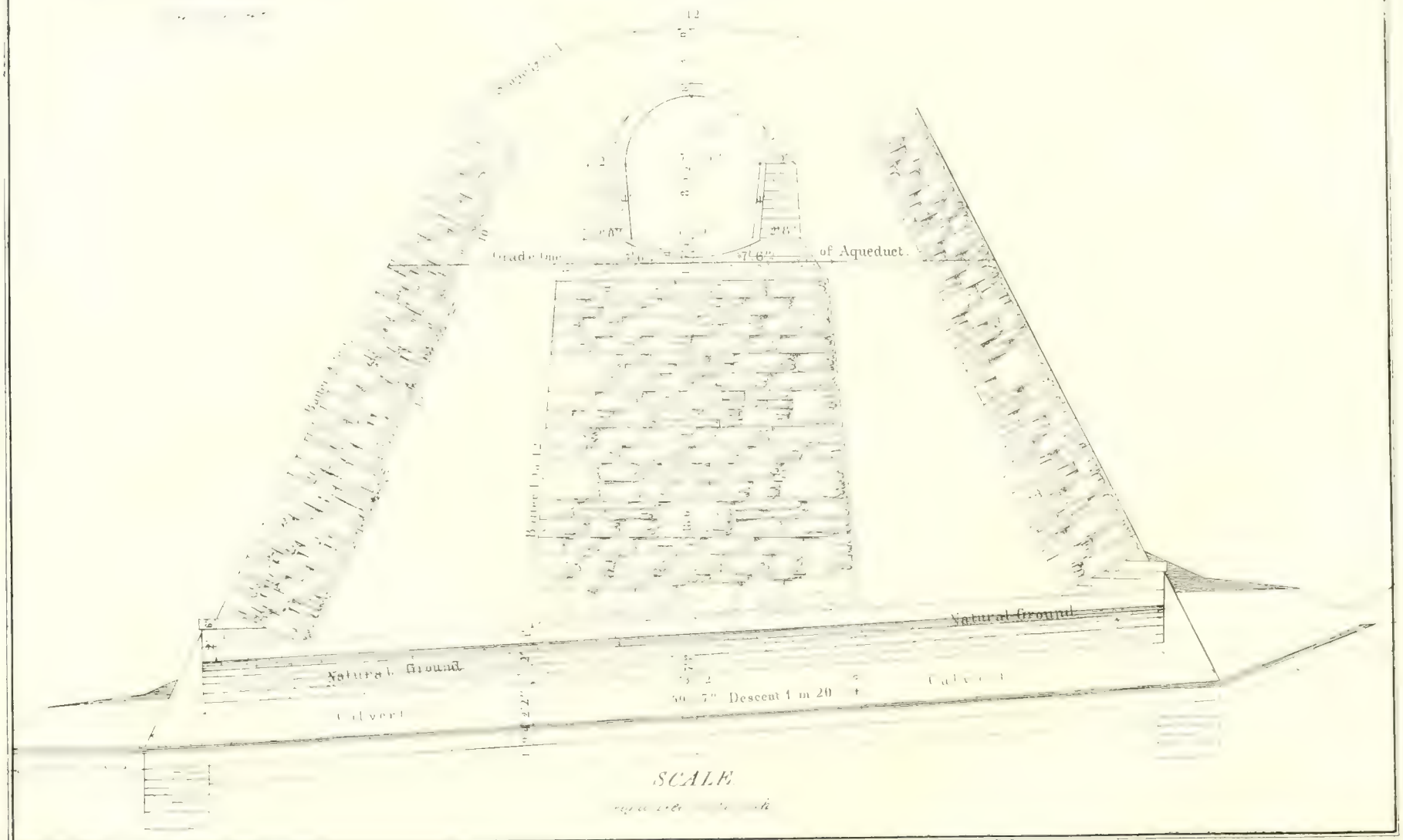
At the last session, provision was made for the appointment of a commissioner to examine certain locations in the northern part of the state, with a view to ascertain the practicability of employing the convicts, in a new prison proposed to be erected, in the labor of mining. The system may therefore be represented as still in a somewhat unsettled state; and a short period may witness the application to it of changes, of which it might not be easy to predict either the extent or the nature, even if it were proper here to engage in any speculation of this character.

A few words, before passing from this subject, are due to another excellent institution which occupies a not unimportant position in the penitentiary system of the state — the institution for the reformation of juvenile delinquents, in the city of New-York, commonly known as the House of Refuge. This was the first establishment of this kind in the union, having been founded in the year 1824; though it presented an example which was speedily followed by other states. It grew out of the philanthropic efforts of a private association of gentlemen in New-York, who were incorporated March 29, 1824, under the title of the "Society for the Reformation of Juvenile Delinquents;" among whom it will not be deemed invidious to particularize as among the most prominent and active, the late Thomas Eddy and Cadwallader D. Colden, and also Mr. Charles G. Haines, who, as chairman of a voluntary committee, was the author, in 1824, of a very able and valuable report on the history and discipline of penitentiaries in the United States, from which much aid has been derived in the hasty preparation of these pages. It was founded on a basis of private subscription, aided by annual assistance from the state; and is administered by officers chosen by the society, and superintended by its constant vigilance, under a system of general laws for its government, enacted by the legislature. It thus partakes of the character partly of a private, though mainly of a public institution; while it has been one of very eminent utility for the rescue of thousands from a career of crime and ruin. It is conducted for the most part on the general plan of the Auburn establishment, though moderated in severity, and adapted to the different class of subjects embraced within its action; children of both sexes are received in it under the age of sixteen. It is a just subject of pride to both the state and the city, as well as of gratitude to its founders and supporters.

CROTON AQUEDUCT.

J B Jervis

Section in crossing Valleys

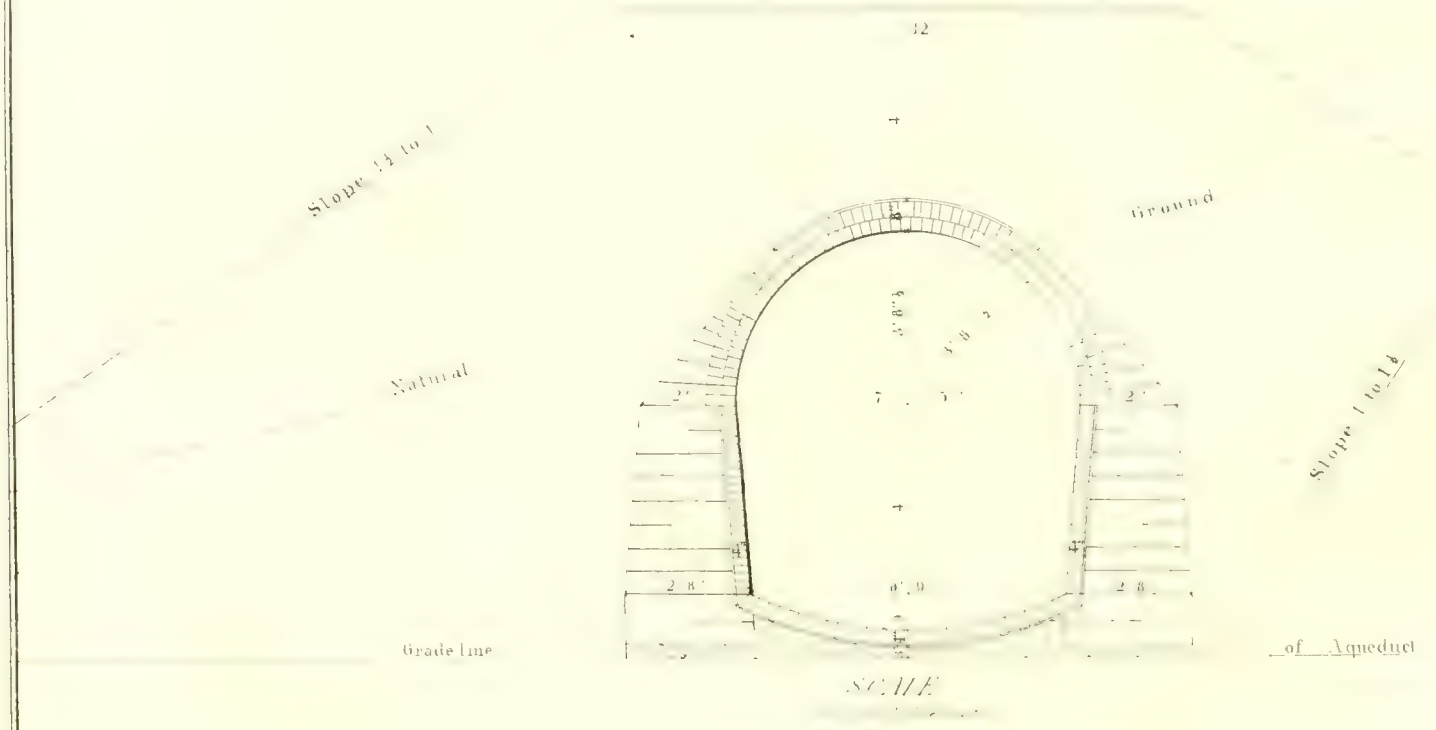


SCALE

CROTON AQUEDUCT.

J.B. Jervis
Chief Engineer

Section in excavations



To WILLIAM H. SEWARD,

Governor of the State of New-York.

SIR,

I submit a Report on the Zoology of the State;

And have the honor to be,

With great respect,

Your obedient servant,

JAMES E. DE KAY.

THE LOCUSTS, QUEENS Co., L. I.
January 1, 1842.

PREFACE.

The examination of the Quadrupeds, (or as they are with more exactness, although perhaps with less elegance named, the Mammalia or Mammiferous animals) of the United States, has, until recently, attracted comparatively little attention among our own citizens. A few isolated species had been casually noticed, a few detached facts recorded; and here and there, over this widely extended country, a few zealous observers, aware of the general apathy at home, had transmitted their observations to distinguished foreign naturalists. Such instances were, however, of comparatively rare occurrence. The chief historians of our animals have been foreigners, either accidentally led to our shores by motives entirely unconnected with scientific pursuits, or naturalists sent out under the patronage of their respective governments, to collect and describe our animals. In the first class may be mentioned De Liancourt, De Chastellux and others; in the second, Bosc, Kalm, Michaux and Pal. de Beauvois. To these, and to other European naturalists who have described through the imperfect and often distorted medium of preserved specimens, we are indebted for the greater part of the knowledge which we possess respecting many of our own animals.

Of late years, the attention of our countrymen has been more directed to the study of Zoology. The establishment of the Academy of Natural Sciences at Philadelphia, forms an epoch in this department of knowledge. This was soon succeeded by the formation of the Lyceum of Natural History of New-York, and by others in Boston, Baltimore, New-Haven and Salem. The American Journal of Science, which, under the efficient guidance of Professor Silliman, has now reached its forty-third volume, is a rich mine to the American naturalist, and has contributed to promote and extend a taste for such inquiries.

At the commencement of the Survey, the services of an eminent naturalist, Mr. Abraham Halsey, of New-York, were engaged for the department of zoology; but before he had entered upon its duties, other engagements and occupations demanded his attention, and he resigned his office. We may be permitted to express our regret that circumstances should have prevented him from undertaking a task, which could not have been committed to an abler hand.

In the execution of this part of the work, I have to acknowledge my obligations to Maj. Le Conte, for the valuable hints he has suggested, and the opportunities which he has afforded of examining his drawings, manuscripts and specimens. To Dr. Emmons, of the geological department of the Survey, I am obliged for his numerous specimens and communications. His many sterling qualities can scarcely be appreciated, except by those who, like myself, have been the companion of his journies through the uninhabited and as yet unknown forests of the northern district. To Prof. Hall, also of the Survey, I am indebted for several specimens, and for valuable communications on the zoology of the State. Mr. J. G. Bell and Mr. W. Cooper of New-York, Dr. Harlan of Philadelphia, and the Rev. Mr. Linsley of Elmwood Place, Connecticut, have also in various ways facilitated my inquiries. I must also record my obligations to the Lyceum of Natural History of New-York, for the opportunities which their valuable collection has afforded me of comparison and description.

Having thus briefly adverted to the sources of information, in connection more especially with the Mammalia of the State, it may be deemed proper to give a concise sketch of the region whose animals we have undertaken to describe.

New-York, one of the twenty-six States of the North American Confederacy, lies wholly within the temperate zone. Its figure may be compared to that of an irregular triangle, with its apex touching the Atlantic, and one of its sides bounded by two of the great inland seas, and by their outlet to the Gulf of St. Lawrence. Its connection with the Atlantic is extended easterly one hundred and forty miles, by a low sandy spur called Long Island. Including this easterly prolongation, the State of New-York may be said to extend through eight degrees of longitude, and to be included between 40° 30′ and 45° of north latitude. It contains more than 46,000 square miles, a surface larger in extent than that contained in Poland or Scotland, or Naples and Sicily; three times larger than the Swiss Confederacy, and nearly equal in extent to that of England. Although situated within the same parallels of latitude which include the greater part of

Italy, the south of France, and the northern parts of Spain; yet from the well established fact of the more southerly position of the isothermal lines on the western shores of the Atlantic, its mean annual temperature cannot be compared with that of the above mentioned countries, but rather with those lying from fifteen to twenty degrees farther north. The result of ten years' observations at New-York, gives one hundred and sixty-five days, or about five months, as the mean duration of winter; but in the interior or northern district, many of the counties have scarcely a month without frost. This, it will readily be perceived, must exercise a great influence upon the number and distribution of its animals; for while it has the summer heats of Spain and Italy, the rigor of its winters equals those of the northern portions of Europe. From this diversity of climate, it results that we have in the State similar classes of animals with those found in the northern parts of Europe, and at the same time other families existing chiefly in its southern portions. The families *Cervidæ* and *Mustelidæ* may serve as examples of the one, while the *Vespertilionidæ* and *Muridæ* will illustrate the other.

Varieties of surface are also well known to be favorable to the multiplication of animal species, and in this respect, the State of New-York offers a great diversity; for although few of its mountains exceed the height of five thousand feet, yet from the peculiarity of climate alluded to above, their summits have a temperature much lower than mountains of even higher altitude in corresponding parallels in Europe. The surface of New-York is considerably elevated, much of it lying on the great Allegany table land. The diversity of surface is, however, so great, that for the purposes of more intelligible description, we may consider it as divided into four principal zoological districts, each sufficiently distinct in itself, but of course so much blended at the lines of separation as not to be contradistinguished.

1. *The Western District*, includes that portion of the State which is bounded on the west and north by Lakes Erie and Ontario, and on the south by the boundary line separating it from the State of Pennsylvania; and it extends eastwardly until it is lost in the valley of the Mohawk on the north, and the mountainous parts of the Hudson district. A large portion of this district is an elevated region, furrowed by valleys running in a north and south direction, supposed once to have been the outlets of a great inland ocean, but now the beds of rivers which, pursuing opposite courses, discharge themselves on the one hand through

Lake Ontario into the Gulf of St. Lawrence, and on the other into the Delaware and Chesapeake bays, and into the Gulf of Mexico. The central portion of this district is a level table land, rising in its southern parts into elevations of from a thousand to twelve hundred feet above tide, and abruptly subsiding on its western borders to the level of the great lakes. In the western part, we have the Cattaraugus and Tonawanda streams pouring into Lake Erie and Niagara river; the sources of the Allegany river; one of the branches of the Ohio, itself a tributary to the Mississippi; and another branch of the Allegany takes its rise from Chautauque lake, a sheet of water sixteen miles in length, 1291 feet above tide, and 726 above Lake Erie. Eastward of these is the Genesee river, which, taking its rise in Pennsylvania, crosses the whole district in a north direction, and empties into Lake Ontario. As we proceed eastwardly, we cross successively, in the southern portions of this district, the Canisteo, Conhocton, Chenango, and great western branch or principal source of the Susquehannah, which takes its rise in the Otsego lake, a sheet of water nine miles long, with a breadth varying from three quarters of a mile to three miles. The central portions of this district are occupied by a series of ten to twelve lakes, stretching generally to north and south, varying from fifteen to thirty-eight miles in length; all discharging themselves by one common outlet, the Oswego river, into Lake Ontario. On its extremely eastern border rises the Mohawk, a tributary of the Hudson, which connects it zoologically with the Hudson river district. The great inland seas of Erie and Ontario, the one two hundred and seventy miles in length, with a breadth from twenty to fifty miles; and the other one hundred and ninety miles, with an average breadth of forty miles, exercise a great influence on its climate and consequent zoological character. The surface of Lake Erie, which is three hundred and thirty-four feet above Lake Ontario, discharges its waters through the rapids and falls of Niagara river, into that lake, within a distance of thirty-six miles. This entire district is exceedingly fertile, and is covered by a vigorous growth of forest trees in the uncultivated portions. Without entering into details which would find a more appropriate place in a topographical survey, it will be perceived, that while on the one hand the vicinity of such large masses of water must ameliorate its climate, its fertile soil irrigated by so many streams will furnish the means of subsistence to numerous species of animals. It is zoologically connected by its valleys and water courses with the great basin of the St. Lawrence, and we accordingly find in this district animals common to both, although

not to so great an extent as in the region next to be described. Among the Mammalia, we find the Northern Lynx, the Deer Mouse and Porcupine; while all the lakes in the interior of this district, which empty into the Lake Ontario, formerly abounded with Salmon, which found their way from the sea through the Gulf and River St. Lawrence. In its southern portions it is similarly connected with the basin of the Mississippi, and the intermediate regions are watered by the streams which empty into the Delaware and Chesapeake.

2. *The Northern District* comprises, as its name imports, the northern portion of the State, which forms an irregular truncated triangle, bounded on its western side by Lake Ontario and the River St. Lawrence, on its eastern side by Lake Champlain and Lake George, and lying north of the Mohawk valley. This district, in its southern and southeastern portions, rises into numerous conical peaks and short ranges, attaining in some places an elevation of more than five thousand feet. Towards Lakes Champlain and George, these subside suddenly to the level of those sheets of water. To the north and northwest, this descends by a gradual and almost imperceptible slope towards the River St. Lawrence. This slope is watered by the Oswegatchie, the Moose and Black rivers, the Raquet and Grass and St. Regis rivers, all arising from numerous lakes embosomed in the mountainous regions of its southern parts. Lake Champlain, a part of its eastern boundary, extends north and south one hundred and forty miles, is twelve miles wide in its broadest part, and discharges its water through the Sorel river into the St. Lawrence. Into the southern part of this lake is also poured the waters of Lake George or Horicon, thirty-seven miles long, and varying from one to seven miles in breadth. The cluster of mountains in its southeastern portions may be considered as an offset from the great Appalachian system, which, descending through the States of Maine, New-Hampshire and Vermont, passes southwesterly between the Western and Hudson river districts, and is continued under the name of the Allegany range of mountains. In this region too we find the Sacondaga, Cedar, Jessup, and other tributaries of the Hudson, within a short distance of those which pour into the St. Lawrence. This mountainous region comprises the counties of Essex, Hamilton, Herkimer and Warren, and the southern part of the counties of Clinton, Franklin and St. Lawrence, and has been estimated to contain an area of about six thousand square miles. Its zoological character is strongly impressed by the features just alluded to. The chief growth of trees in this district are the Spruce, Pine, Larch, Balsam, Fir and

Cedar. We find in this district many of the fur-bearing animals, such as the Sable, the Fisher, and the Beaver. Here too roam the Moose, the Wolverine, and others now only found in high northern latitudes. It also forms the southern limits of the migration of many arctic birds; and we accordingly meet here with the Canada Jay and Spruce Grouse, the Swan, the Raven and the Arctic Woodpecker.

3. *The Hudson Valley District,* includes those counties watered by the River Hudson and its tributaries. Its chief tributary, the Mohawk, after a course of about one hundred and forty miles, enters the Hudson from the west, at the distance of one hundred and sixty miles from its entrance into the ocean. The shape of this district is of course modified by the length and direction of the Mohawk river, and bears some resemblance to the letter ⅂ inverted. Smaller than either of the two preceding, it is nevertheless of much zoological interest. At its upper portion, it is connected with the Northern district, and contains many animals in common with the States bordering on the eastern margin. Along its western border, it becomes elevated into high ranges of mountains, called the Kaaterskills, some of which attain an elevation of nearly four thousand feet, containing deer, wolves, panthers and bears. By the valley of the Mohawk, it is zoologically connected with the Western district; and this connection is becoming daily more obvious, by the great artificial water channels which reflect so much honor on the zeal and enterprise of her citizens. Thus the Soft-shelled Turtle and Rock Bass of Lake Erie is now found in the Hudson; in the same way that the Yellow Perch, the Muskallonge, and others peculiar to the great lakes, have, by means of the Ohio canal, found their way into the Mississippi through the Ohio. On the south it is connected with the Atlantic, and accordingly we find it teeming with the inhabitants of the ocean. On the other hand, the Hudson river appears to form a natural geographic limit to the extension of some species, at least in any considerable numbers. Thus, the Opossum of the South rarely, if ever, outsteps this boundary; among reptiles, the Chain Snake and Brown Swift, and the Buzzard and many other species among the birds. From the north also this river appears to be a barrier to their progress south; but these will be more fully detailed in the course of the following pages.

4. *The Atlantic District* comprises Long Island, with a medium breadth of ten miles, extending in a northeasterly direction one hundred and fifty miles. Its insular position influences its climate, and we accordingly find a great difference

between its temperature and that of the main land. It is a low sandy region, with extensive plains, and rising along its northern borders into hills of moderate elevation, at but one point only exceeding three hundred feet in height. Although much smaller than any of the preceding districts, yet it possesses some zoological features of interest. Its insular position, and its early settlement, has occasioned the extirpation of the larger quadrupeds, such as the Otter, Wolf and Bear; but deer are still numerous. It is more remarkable for the abundance and variety of its birds, than for the number of its mammalia. Here we find the extreme southern limits of the migrations of the arctic species, and the northernmost termination of the wanderings of the birds of the torrid zone. Thus we find in winter in this district, the Eider Duck, the Little White Goose, the Great Cormorant, the Auk, and many others from the Arctic ocean. During the heats of summer, we meet with the Turkey Buzzard and Swallow-tailed Kite, the Fork-tailed Flycatcher from the tropical wilds of Guiana, and numerous others from the south. It seems also to be the boundary between the fishes and other classes of the northern and tropical seas, and occasionally furnishes specimens from either extremity.

In conclusion, we have to make a few observations respecting the illustrations which accompany this work. These were all executed by Mr. J. W. Hill, and with the exceptions which are noted in their proper places, were taken from the animal itself, either alive, or from specimens carefully mounted by persons who had been conversant with their habits during life. In some classes, where the colors were fleeting, several individuals were successively employed, in order to secure with more certainty their evanescent hues. The outlines in all cases were taken with the camera lucida, which we conceive to be the best and most expeditious mode hitherto devised. It will be observed that the figures are not on a uniform scale, and that a small animal is often represented apparently larger than one of greater bulk. This could not be remedied, except by drawing them all on a scale which would have involved an expense of time and means utterly useless, and inadequate to the purposes of the Survey. This apparent defect is remedied by a notice on the plate, of the scale upon which the species is drawn; and the measurements throughout the work are uniformly given in feet, inches, tenths and hundredths, which correspond with those employed by the English.

It was originally proposed to employ the most eminent engravers upon the illustrations, in order to render the work more worthy of the State under whose auspices it was undertaken, and at the same time to furnish specimens of the

state of this particular branch of the fine arts at the period of publication. This was, however, soon found to involve an enormous expense, and to be accompanied with a delay utterly incompatible with the early publication of the work. Most of the Mammalia, and a few of the Birds and Fishes, are thus executed; but we hope that in the lithographies furnished by Mr. G. Endicott, the naturalist will not regret a departure from the original plan.

In one instance I have introduced the figure of a species not known with certainty to exist in the United States, and for which an explanation may appear necessary. I allude to the Manati, or Sea Cow of South America. The exceedingly rare opportunity which I had of examining this animal in a living state, of having a faithful drawing made, and of being subsequently enabled to enter into some of the osteological details, was too valuable to be allowed to escape. It was thought that it would be interesting to the American naturalist, to be thus enabled to compare it with the Florida Manati, from which it has been strongly suspected to be specifically distinct. I was, moreover, desirous of giving an accurate illustration of one of the herbivorous cetacea, a group the least known of all the class Mammalia.

I may possibly have attached more importance to the various popular names given in different districts, than will perhaps be acknowledged by the technical naturalist. It has been objected to their use, that they are often unmeaning or absurd, and often doubtful in their application. The careful collator of synonimes will, however, doubtless have discovered that the same charge may often be applied to names drawn up with technical nicety, and in conformity with the laws of nomenclature. As this work is intended for general readers, I have introduced popular names whenever they could be obtained. The greater part of our knowledge of the habits of animals is derived from persons unskilled in natural history; and the fact that the same popular name is variously employed in different districts, will often enable us to avoid error. A familiar example of this is afforded by the history of the Wolverine. Under this name three different animals, the Northern Lynx, the Wolverine proper and the Bay Lynx have been described, and their habits strangely confounded by writers who were not aware that the same popular name had been applied in different districts to them all.

In consulting authorities, we have taken pains to cite all the American writers within our reach. The student is frequently at a loss where to find descriptions of such animals as may come under his notice; and these are distributed through

so many journals, magazines and other periodicals entirely unconnected with natural history, that we hope their citation will be favorably received. In settling the weight due to contradictory statements, we have endeavored to avoid the influence which is supposed to be connected with the *verba magistri;* and in all cases have freely, and we trust not offensively, expressed our opinions when our own observations have been at variance with those of previous writers.

JAMES E. DE KAY.

The Locusts, Queens County.
January 1, 1842.

TABULAR VIEW

OF THE

GENERA OF MAMMALIA OBSERVED IN THE STATE OF NEW-YORK.

Orders.	Families.	Genera.
Marsupiata,	Didelphidæ,	Didelphis.
Carnivora,	Vespertilionidæ,	Vespertilio.
	Soricidæ,	Condylura.
		Scalops.
		Sorex.
		Otisorex.
	Ursidæ,	Ursus.
		Procyon.
		Gulo.
	Mustelidæ,	Mephitis.
		Mustela.
		Putorius.
	Lutridæ,	Lutra.
	Canidæ,	Canis.
		Lupus.
		Vulpus.
	Felidæ,	Felis.
		Lyncus.
	Phocidæ,	Phoca.
		Stemmatopus.
Rodentia,	Sciuridæ,	Sciurus.
		Pteromys.
	Arctomidæ,	Arctomys.
	Gerbillidæ,	Meriones.
	Castoridæ,	Castor.
		Fiber.
	Hystricidæ,	Hystrix.
	Muridæ,	Mus.
		Arvicola.
	Leporidæ,	Lepus.
Ungulata,	Elephantidæ,	Elephas.
		Mastodon.
	Suidæ,	Sus.
	Equidæ,	Equus.
	Bovidæ,	Bos.
	Capridæ,	Ovis.
	Cervidæ,	Cervus.
		Elaphus.
		Rangifer.
Cetacea,	Balænidæ,	Balæna.
		Physeter.
		Rorqualus.
	Delphinidæ,	Globicephalus.
		Phocæna.
		Delphinus.

THE NEW-YORK FAUNA.

CLASS I. MAMMALIA.

VIVIPAROUS, OR BRINGING FORTH THEIR YOUNG ALIVE. SUCKLE THEIR YOUNG BY MAMMÆ OR TEATS, AND HENCE THE NAME. FURNISHED WITH WARM RED BLOOD. HEART WITH TWO AURICLES AND TWO VENTRICLES; BREATHING BY LUNGS. BODY USUALLY COVERED WITH HAIR, AND FURNISHED IN MOST CASES WITH FOUR FEET.

The characters assigned to this class are sufficiently distinctive; and yet, with the single exception of suckling their young, none are absolute or invariable. Thus in the *Manis* and *Armadillo* of South America, the body is covered with scales; in the *Manatus* of Florida, there are but two feet; and these in the *Whales*, *Porpoises*, &c. are reduced to the shape and functions of fins. In the totality of the characters, however, we obtain a correct idea of the class under consideration.

According to the generally received arrangement of the animals of this class, it is divided into seven orders.* The characters of two of these are derived from the number or structural functions of their extremities; of three, from the form, disposition or entire absence of their teeth; of the sixth, from the nature of the coverings of their feet; and of the seventh, from the form of their body, and the element in which they live, and the peculiar shape and arrangement of their extremities.

* From the time of Aristotle to the present day, *Man* has invariably been placed at the head of this class. There are not wanting, however, many eminent naturalists, who are unwilling to see Man standing as a representative of a Genus, or even of of an Order among his kindred brutes; who are not disposed to admit that Man, created in the image of God, has any affinity with the beasts that perish; or that, because he possesses certain zoological characters which are entirely secondary and subordinate, he should be classed with brutes, when his noblest attribute, reason, destroys every vestige of affinity, and places him immeasurably above them all.

In any natural arrangement, the most appropriate distinction of each order would seem to be that which is derived from the same set of organs. This has, however, been attempted in vain; and we are accordingly left at liberty to select from the various systems that which may seem best adapted to the great end proposed by all naturalists, the knowledge of species, and their relations to each other.

The animals arranged under the Order QUADRUMANA, comprising Lemurs, Monkeys, &c. are rarely found on this continent beyond the tropical regions, and of course are not known within our territorial limits. Lichtenstein asserts that none have been seen beyond the twenty-ninth degree of north latitude.

ORDER II. . MARSUPIATA.

Carnivorous and herbivorous. Thumb of the hind feet opposable to the toes, the nail small or wanting. Many of the females with abdominal pouches opening externally, and supported by peculiar bones attached to the pubis. Teeth various, but usually numerous. Tail long, naked or hairy, generally prehensile.

OBS. The natural position of the animals belonging to this order, has long exercised the ingenuity of naturalists. Their internal organization is so varied and peculiar, that as CUVIER observes, they may be looked upon as a class containing several orders running parallel with the orders of the ordinary quadrupeds. Some species, by their teeth, naturally belong to the Order *Carnivora;* whilst others can only be arranged (in a system derived from the teeth alone) with the Order *Rodentia;* and this has in fact been attempted by some naturalists.

We have ventured to place this order here, as it seems to form, by the structure of its feet and tail, a natural passage from the Quadrumana.

FAMILY DIDELPHIDÆ.

Three kinds of teeth, forming nearly a continuous series. Tail long, naked or hairy, usually prehensile. Female with a loose fold of skin on the abdomen, forming a sac or pouch for the reception of her young.

OBS. The animals of this family are found in America, Australia and the Indian Archipelago. The sac or pouch is supported by two bones attached to the pubis; and it is worthy of note, that the male, who has no pouch, nevertheless possesses these marsupial bones. It is stated by geologists, that the earliest mammiferous animals whose remains are found in the ancient strata belong to this order. None have been found, we believe, in North America,

and they are of very rare occurrence in any part of the world.* There are about fifty living species, distributed among ten or twelve genera, which have been described by different naturalists; but one only is found in the United States.

GENUS DIDELPHIS. *Linneus.*

Muzzle pointed; ears large and membranous. Internal toe of the hind foot opposable, without a nail. Tail half hairy and scaly. Teats varying in number, and placed within the pouch. Teeth, 48–50: *Incisors,* $\frac{10}{8}$; *Canines,* $\frac{2}{2}$; *Cheek teeth,* $\frac{12-14}{14}$.

THE AMERICAN OPOSSUM.

DIDELPHIS VIRGINIANA.

PLATE XV. FIG. 2.

Virginian Opossum. PENNANT, Arct. Zool. Vol. 1, p. 73; Hist. Quad. Vol. 2, p. 18, pl. 63.
Le Sarigue à oreilles bicolores. CUVIER, Règne Animal, Vol. 1, p. 172. Ed. prima.
Didelphis virginiana. HARLAN, Fauna, p. 119. GODMAN, Am. Nat. Hist. Vol. 2, p. 7 (figure).
Virginian Opossum. Griffith's Cuv. Vol. 3, p. 24 (figure).

Characteristics. Greyish white. Fur woolly, intermixed with long white hair. Ears black; base and margin flesh color. Length two feet.

Description. Head long and pointed, with the facial outline nearly straight; long black bristles on the sides of the nose, over each eye and on the sides of the cheeks. Eyes oblique, and placed near the facial outline. Nostrils separated by a groove. Ears thin, membranous. Gape of the mouth wide, and exhibiting most of the teeth. Nails rather short, and curved on all the toes, except on the thumb or inner toe of the posterior extremities. In the figure given by Godman, this is represented as clawed, but his generic character asserts the contrary. Soles of the hind feet furnished with large fleshy tubercles. Mammæ or teats are, according to Desmarest, thirteen in number, and disposed in a circle around a central one; according to Godman, there are eight on each side, which we suppose to be the normal number. Tail enlarged at the base, where it is hairy for about four inches; the remaining part scaly, and covered with a few inconspicuous short rigid hairs. Fur of two kinds; a short woolly hair beneath, intermixed with longer and more rigid hairs, but all are very soft. Incisors ten above, the two anterior rather cylindrical, longest; an interspace between the incisors and the canine, which is compressed and pointed; the first jaw tooth smallest, the four first compressed, the three last transversely broader. In the lower jaw, the eight incisors rounded and directed forwards, with no interspace between them and the canine. The cheek teeth with regular points, and not transversely dilated.

Color. Greyish white, darker along the sides; on the face and abdomen, lighter grey. This color is produced by the intermixture of the short wool, which is white at the base and

* BRODERIP, Zool. Journ. Vol. 3, page 408.

black at the tips, with the long white hairs. On the back, and on the legs, this color becomes of a deeper hue, with various shades of intensity, sometimes even approaching to black. Ears black at base, the borders white.

Length of head and body, 15·0 – 20·0.
Length of tail, ... 10·0 – 12·0.
Weight, ... 10 – 14 lbs.

The Opossum is a nocturnal animal, moving with great agility among the branches of trees, and using his tail as a means of support, in the same way that it is employed by the members of the Family *Cebidæ*, or Monkeys of South America. On the ground his movements are clumsy and slow, and he appears to depend more upon cunning than upon strength or activity for the means of escape. When surprised on the ground, he compresses himself into the smallest possible space, and remains perfectly quiet. If discovered, and even handled in this state, it still counterfeits death, and takes the first opportunity to effect its escape. From this and other traits of cunning, has arisen the local phrase of "playing possum," to designate any adroit cheat.

The singular and anomalous organization of this animal, and its consequent peculiarities of reproduction, have long excited much attention among scientific inquirers. The young are found in the external abdominal sac, firmly attached to a teat in the form of a small gelatinous body, not weighing more than a grain. It was for a long time believed that there existed a direct passage from the uterus to the teat, but this has been disproved by dissection. Another opinion is, that the embryo is excluded from the uterus in the usual manner, and placed by the mother to the teat; and a third, that the embryo is formed where it is first found. Whether this transfer actually takes place, and, if so, the physiological considerations connected with it, still remain involved in great obscurity.

I do not find with whom the Latin specific name originated. It is usually attributed to Pennant, who, in his History of Quadrupeds, calls it the *Virginia Opossum*, and refers to Linneus under the name of *Didelphis marsupialis*. In Gmelin, it stands as *Didelphis opossum*.

The Opossum is an inhabitant of the temperate regions of North America. Although it is abundant in New-Jersey, I have never seen it in this State, but have heard that it has been noticed in the southern counties on the west side of the River Hudson, and it will probably be found in the western counties. I am not aware that it has ever been observed east of the Hudson. It inhabits chiefly wooded districts, and, as might be inferred from its structure, passes most of its life on trees. It feeds on birds and their eggs, on wild fruits, especially the persimon (Diospyros virginiana.) It is an excellent article of food, resembling in flavor that of a sucking pig. When pressed by hunger, it occasionally prowls round the barnyard, and commits ravages among the poultry. Its westerly distribution extends to the Pacific, as it has been found in California, and it is asserted to be common in Mexico, and inhabits all the intertropical regions; but it is possible that it may have been confounded with two other closely allied species found in South America.

ORDER III. CARNIVORA.

Furnished with sharp and strong claws. Three kinds of teeth, differing considerably from each other. Living exclusively on animal substances, and the more exclusively so as their teeth are furnished with acute points. No thumbs on the fore feet opposable to the other fingers.

This order embraces animals exceedingly varied in form, such as the Bat and Seal, Shrew-moles, and Bears. It represents the Order *Feræ* of Linneus, and a portion of his *Primates*. In this State, we have the representatives of eight families.

FAMILY I. VESPERTILIONIDÆ.

Anterior fingers excessively prolonged; the anterior and posterior extremities connected by a more or less naked expansion of the skin, adapted to flight. Two pectoral mammæ. Penis external, pendulous. Incisors varying in number. Summits of the cheek teeth ending in sharp points. Prey upon the wing. Hybernate.

This is a natural and very numerous group, comprising more than one hundred and fifty species, distributed over the globe. These are arranged by modern systematic writers under twenty-seven genera, and this has been subsequently carried to forty-eight genera. Their habits are nocturnal, feeding almost exclusively upon winged insects. Some species, however, are occasionally seen flying about in open daylight. We have noticed five species in the State of New-York, all included under one genus.

GENUS VESPERTILIO. *Linneus.*

Incisors two to four above and six beneath; anterior cheek teeth simple conic; the posterior with sharp points. No nasal appendages; the ears lateral and distinct. The index finger of one joint. Tail rarely exceeding the interfemoral membrane.

Obs. In this latitude, the Bat, on the approach of winter, retreats to cavities in trees, or to caverns, and becomes perfectly torpid. They bring forth from one to three at a birth, in the months of June and July. Period of gestation unknown.

THE NEW-YORK BAT.

VESPERTILIO NOVEBORACENSIS.

PLATE I. FIG. 2.—(STATE COLLECTION.)

New-York Bat. PENNANT, Arctic Zoology, Vol. 1, 184.
Vespertilio noveboracensis. LINNEUS, Syst. Gen.
Red Bat. WILSON, Am. Ornithology, Vol. 6, plate 50.
Vespertilio rufus. WARDEN, Disc. U. S. Vol. 5, 608.
Vespertilio noveboracensis. HARLAN, Fauna Americana, p. 20.
V. id. GODMAN, Am. Nat. Hist. Vol. 1, 68, figure.
Taphozous rufus. HARLAN, Faun. Am. p. 23.
New-York Bat. COOPER, Ann. Lyc. New-York, Vol. 3, 57. KIRTLAND, Zool. Report, p. 175. EMMONS, Mass. Rep. 1840, p. 9.

Characteristics. Color reddish tawny. Brachial membrane naked above, except near the body and at the base of the phalanges. A patch of white hairs at the insertion of the wings.

Description. Ears broad, with an obtuse tip and a naked anterior lobe. Nostrils tubular, with a few short black whiskers on the sides of the cheeks. Interfemoral membrane broader than long, including the entire tail, and is supported by a bony process from the tibia on each side a quarter of an inch long. This process is most obvious from beneath. The membrane is naked beneath for more than two-thirds of its extent; hairy above. Hind feet with five subequal toes, of which the interior is shortest. Brachial membrane entirely naked, except near the thumb. Dental formula: Incisors, $\frac{2}{6}$; canines, $\frac{2}{2}$; cheek teeth, $\frac{8}{10}$ = 30.

Color, of the head and cheeks reddish tawny, which is also the general color of the fur on the body above, frequently mixed with white, and producing a light cream or hoary color, and often a bright chesnut red. A small portion of the brachial membrane nearest the body, and the whole of the interfemoral membrane, together with the legs, covered with tawny hair; this is longest, and varied with white, on the sides of the body. Beneath, the general color is somewhat lighter, and the fur extends but a short distance down the interfemoral membrane. A white patch of hair on the sides of the body near the insertion of the wings, most conspicuous on the under side. The brachial membrane is dark brown, with lighter colored reticulations, and entirely denuded, except near the thumb-nail above and a short distance along the course of the forefinger, where we may observe a few white hairs. On the under side of this membrane is a patch of light tawny hair at the base of the phalanges, and extending sparsely along the forearm.

Total length,	3·0 – 4·0.
Length of tail,	1·5 – 1·8.
Spread of wings,	10·0 – 12·0.

This is the most common species in our State, and can scarcely be confounded with any other unless it may be with the Hoary Bat. It is usually, however, smaller, but resembles it in

its dentition, and frequently in its external markings, even to the white spot at the insertion of the wings. Its strongest distinctive character is to be found in its general tawny hue, and the absence of a hairy patch at the elbow or first joint of the forearm. One of the specimens, which furnished us with the preceding description, is among the largest we have seen, approaching very nearly in size to the hoary bat.

The geographical range of this species, as far as it has yet been noticed, extends between the thirty-third and forty-second parallels of latitude, and from Massachusetts to the Rocky Mountains. According to Kirtland, it is comparatively a rare animal in Ohio. Except in the northern mountainous districts, it occurs in every part of this State.

THE HOARY BAT.

VESPERTILIO PRUINOSUS.

PLATE II. FIG. 2.—(STATE COLLECTION.)

Vespertilio pruinosus.		SAY, Long's Expedition to the Rocky Mountains, Vol. 1, p. 168.
V.	*id.*	HARLAN, Fauna Americana, p. 221. GODMAN, Am. Nat. History, Vol. 1, p. 68, figure 3.
V.	*id.*	RICHARDSON, Fauna Boreali Americana, Vol. 1, p. 1.
V.	*id.*	COOPER, Ann. Lyceum N. Y. Vol. 4, p. 54.
V.	*id.*	WHEATLAND, Essex Journal Nat. Hist. Vol. 1, p. 76. EMMONS, Mass. Rep. 1840, p. 8.

Characteristics. Greyish above. Margin of the interfemoral membrane naked; a small white hairy patch at the elbow and wrist above. Lips and chin black. Throat with a fawn-colored band.

Description. Body robust. Ears broad, short and rounded; naked on the superior margins, hairy within, and with a tuft of fawn-colored hair behind the anterior margin, which is broadly dilated and free at the base. Tragus or inner ear hairy externally, convex on its outer margin, concave on its inner margin, and terminating in an obtuse tip. Wing membrane naked above the small tufts noted in the specific phrase. Interfemoral membrane hairy, except along the external margins. Beneath, the humeral membrane is covered with dense hair except on the margin; at the insertion of the wings behind the humerus, there is a broad patch of hair extending to the elbow, and forming a band 0·4 broad, along the course of the forearm to the wrist; the remaining part of this membrane is naked. Forearm longer than the tail, which is entirely included in the membrane. Richardson, however, states that in the specimen which he examined, there was a very slight smooth projection of the tail. This may be the case in prepared specimens, but I have not noticed it in recent subjects. Tibial processes stout, and 0·8 long. Dental formula: Incisors, $\frac{2}{6}$; canines, $\frac{2}{2}$; cheek teeth, $\frac{1}{1}\frac{0}{2} = 34$.

Color. Upper part of the head, light yellowish; the parts surrounding the mouth and nose, deep blackish brown; posterior part of the ears two colors, light yellowish at the base, black along the margins; internally there are short greyish hairs; margin black and naked, except on the portion near the nose, where there is a patch of short light yellowish

hairs. Body and interfemoral membrane above covered with hair, black at the base, then light yellowish, subsequently black, and finally tipped with white. From this results a general grey or hoary appearance, which suggested the specific name. Towards the margin of the interfemoral membrane, this hoary color passes into faint reddish. Humeral membrane dusky, with a reddish tint near the shoulder. Beneath, a buff colored band or cravat surrounds the neck; the breast colored like the back, and passing into clay yellow on the abdomen and the anterior part of the interfemoral membrane.

Total length,	4·8.	Thumb nail,	0·4.
Length of tail,	1·6.	Tibia,	0·8.
Fore arm,	2·0.	Spread,	15·5.

This is the largest species observed in this State. It appears to be less nocturnal than many of the other species, and retires quite late to its winter quarters. On the 12th December of this year, (1841,) I noticed two flying about quite actively shortly before noon. It is not a common species. Its geographical range is very extensive. It was first discovered by Nuttall, at Council Bluff on the Missouri; subsequently seen in Georgia by Le Conte, and since noticed in Pennsylvania and Massachusetts. It was found by Richardson as far north as the fifty-fourth degree of latitude. Nothing is known of its habits.

THE LITTLE BROWN BAT.

VESPERTILIO SUBULATUS.

PLATE III. FIG. 2.—(STATE COLLECTION.)

Vespertilio subulatus. SAY, Long's Exped. Vol. 2, p. 65.
V. carolinensis, var. HARLAN, Fauna Amer. p. 22. GODMAN, Am. Nat. Hist. Vol. 1, p. 71.
V. domesticus. GREEN, Cab. Nat. Hist. Vol. 2, p. 290.
V. lucifugus. LE CONTE, McMurtrie's Cuvier, Vol. 1, p. 431.
V. subulatus. COOPER, Ann. Lyc. Nat. Hist. N. Y. Vol. 4, p. 61.
Say's Bat. RICHARDSON, Fauna Bor. Am. Vol. 1, p. 3.

Characteristics. Small olive brown above; greyish beneath. The fore-arm and tail subequal. Tragus awl-shaped.

Description. Head short and broad. Ears membranous, longer than broad, ovate; posterior margin broadly emarginate, somewhat narrowed at the tip. Within sparsely hairy; more densely so at the base, and ascending sparsely along the anterior margins, which are plaited. Tragus linear, subulate, from 0·2–0·3 in length, ending in an obtuse tip. Interfemoral membrane broad; naked, including the tip of the tail. In dried specimens this tip appears beyond the membrane. Fur remarkably soft and silky, and the membranes very thin and delicate. Dental formula: Incisors, $\frac{4}{6}$; canines, $\frac{2}{2}$; cheek teeth, $\frac{12}{12} = 38$.

Color. In the neighborhood of the mouth and chin the hair is of a deep brown, approaching to black. Beneath, the fur is deep brownish black at the base, and light yellowish at the

tips, forming, by its admixture with other hairs, a uniform yellowish grey. Above, the fur is also brownish black at base, and olive brown on the surface.

Total length,	3·3.	Forearm,	1·0.
Tibia,	0·7.	Spread,	9·0.
Tail,	1·0.		

The Little Brown Bat appears to be subject to great variation in size and color. Usually they are scarcely one-half the preceding dimensions. I have received from Prof. Emmons, several specimens of this species, obtained in September from the northern districts. They are smaller, and of a dark hue approaching to black. The plaits on the anterior margins of the ear were not observed. The fur longer than in the specimen described above, which was the same employed by Mr. Cooper in his Monography. The ears appeared to be proportionably longer; but in the black color surrounding the mouth, and in the other characters, no difference could be observed. In one of the specimens, the dorsal surface was varied with black and grey; and in another, dark brown intermixed with olive brown.

The Little Brown Bat can scarcely be confounded with any other species found in this State, unless it be with the Carolina bat. It is found in almost every part of the Union, and ranges as far as the fifty-third degree of north latitude. It has been observed in New-Hampshire, Arkansas at the eastern base of the Rocky mountains, on the Columbia river, in Georgia, Pennsylvania, Carolina, &c. In this State, I have obtained specimens from the northern and western districts. It is very numerous about Lake Oneida, and in the southern counties.

THE SILVER-HAIRED BAT.

VESPERTILIO NOCTIVAGANS.

PLATE I. FIG. 1.—(STATE COLLECTION.)

Vespertilio noctivagans, LE CONTE, McMurtrie's Cuvier, Vol. 1, p. 431.
V. *auduboni*, HARLAN, Am. Jour. Geol. Vol. 1, p. 220, pl. 4.
V. *id.* ID. Med. and Phys. Researches, p. 26, plate.
V. *noctivagans*, COOPER, Ann. Lyc. N. Y. Vol. 4, p. 59.

Characteristics. Black, with silvery hairs above and beneath; above, a whitish collar across the shoulders, extending upwards towards the ears. Tail beyond the membrane.

Description. Body densely hairy, particularly in the region of the neck. Ears large, broad, and obtusely ovate; the outer border with a fold, producing a broad and distinct emargination above, and an abrupt one beneath. Tragus small, ovate, dilated beneath. Nostrils terminal, sub-bilobate. Interfemoral membrane including all but the two last joints of the tail; densely hairy on the anterior part of its upper surface, becoming more sparse as it approaches the extremity of the tail; beneath, it is nearly naked. The bony processes of the tibia, supporting the sides of the membrane, are an inch long. Brachial membrane naked, except near

its junction with the body. Feet hairy, with five subequal toes. Dental formula: Incisors, $\frac{4}{6}$; canine, $\frac{2}{2}$; cheek teeth, $\frac{6}{10} = 34$. Two of the upper incisors have bilobate tips, with a free space between them.

Color. Above of a uniform black or brownish black, the wing membrane being of a somewhat lighter color. On the back there is a sort of collar, composed of white or silver-tipped hairs surrounding the neck, ascending towards the ears, and descending in some instances a short distance down the back. Traces of these white tipped hairs may be observed towards the interfemoral membrane. (In one individual, sent to me by the Revd. Mr. Linsley, from Elmwood, Connecticut, the whole upper surface was varied with white hairs.) Beneath, these silvery hairs are distributed over the breast and abdomen, and more distinctly on the sides towards the brachial membrane.

Total length,.....	3·6.	Alar extent,....	10·0 – 11·0.
Length of tail, ...	1·4.		

The Silver-haired Bat is common on Long-Island, and the southern counties of the State. As far as it is yet known, Connecticut, and possibly Massachusetts, forms its extreme northern range. It has been observed in the Atlantic States as far south as Georgia. The female from which the foregoing description was taken, is much larger than the male. In common with the other species, it takes refuge during the day in hollow trees. Its history is yet incomplete.

THE CAROLINA BAT.

VESPERTILIO CAROLINENSIS.

PLATE II. FIG. 1.—(STATE COLLECTION.)

Vespertilio carolinensis. GEOFFROY, Ann. Mus. Vol. 8, p. 193, pl. 47 and 48.
V. id. LE CONTE, McMurtrie's Cuvier, Vol. 1, p. 481.
Carolina Bat. COOPER, Ann. Lyc. N. Y. Vol. 4, p. 60. EMMONS, Mass. Rep. 1840, p. 10.

Characteristics. Large; chesnut color above; forearm longer than the tail.

Description. Ears large, naked, higher than broad. Tips subacutely rounded, emarginate on the posterior edge. Tragus long and sublinear, resembling that of the little brown bat, but more obtuse at the tip. Interfemoral membrane naked above and beneath, and not including the extreme tip of the tail. The bony processes supporting this membrane are very stout, and nearly an inch long. Dental formula: Incisors, $\frac{4}{6}$; canines, $\frac{2}{2}$; cheek teeth, $\frac{8}{10} = 32$. The two medial incisors notched or bifid towards the tip.

Color. Jaws and snout dark brown. Body above bright glossy chesnut; beneath of the same color, but of a lighter shade, and in some lights appearing as if intermixed with grey. Base of the fur brown, with a few hairs of a greyish hue.

Total length,	3·8.	Tibial process,	0·9.
Length of tail,	1·5.	Spread,	12·0.
Tibia,	0·8.		

This species can scarcely be confounded with any other species, unless it may be with the New-York bat; from this, however, it is distinguishable by its greater size, and its distinct color. The bony processes supporting the interfemoral membrane are so stout and long, as to subtend that membrane, and alter its usual triangular form.

The Carolina Bat is found along the Atlantic States, from Georgia to Connecticut. I have obtained it from Kings county, and Prof. Emmons has observed it at Albany, in the months of February and March. Its season of torpidity is probably of short duration.

(*EXTRA-LIMITAL.*)*

V. monticole. (Bachman, Proceed. Ac. Sc. p. 92.) Fulvous; smaller than *subulatus;* ears shorter; tragus less than half the length of the ear. *Virginia.*

V. virginianus. (Id. ib. p. 93.) Sooty brown, above ash brown; a little larger than the preceding; ears slightly longer and more acute; incisors above simple; interfemoral membrane naked; a black spot at base of the wing. *Virginia.*

Genus Molossus, *Geoffroy.* Head and muzzle very large; canines varying from $\frac{2}{2}$ to $\frac{1}{1}$; incisors in the upper jaw bifid; tragus small forward and outside; interfemoral membrane enveloping about half the tail; nose simple.

M. cynocephalus. (Cooper, Ann. Lyc. Vol. 4, p. 65, figure.) Sooty brown; ears crimped on their posterior half; lips thick and pendent; incisors $\frac{2}{6}$. *Southern States.*

M. fuliginosus. (Id. ib. p. 67, figure.) Sooty brown; incisors $\frac{2}{4}$; more than half the tail free. *Southern States.*

Genus Plecotus, *Geoffroy.* Incisors $\frac{4}{6}$; two large fleshy appendages in the form of crests, between the eyes and nostrils; ears enormously dilated, united at their bases and fringed on their internal margins; tail projecting beyond the membrane.

P. lecontii. (Id. ib. p. 72, figure.) Dusky; beneath towards the tail, white; tragus less than half the length of the ears. *Southern States.*

P. townsendi. (Ac. Sc. Vol. 7.) Ferruginous, beneath reddish ash; tragus half the length of the ears; larger than the preceding. *Columbia river.*

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* Under this head, we include short notices of species observed in the United States, or the adjacent regions, but which we have not seen in this State. The authority for the species must, of course, rest with their respective describers.

FAMILY II. SORECIDÆ.

No lateral membranes performing the functions of wings. Incisors elongated, or spoon-shaped. Molars varying in shape, and with conical points. Muzzle elongated, flexible, sometimes surrounded by filaments. Mammæ ventral. Fur dense, occasionally with rigid hairs or spines. Strong musky odor. Ears rarely prominent. Eyes exceedingly minute. Soles of the hinder feet applied to the ground. Nocturnal; subterranean. Some species hibernate. Comprises the smallest of the quadrupeds.

This family embraces numerous small animals, such as Moles, Shrews, Hedge Hogs, &c. all allied by similar habits. They are for the most part nocturnal, and form their habitations under ground. They all hibernate; and one genus, *Centenes*, Illiger, from Madagascar, is *said* to pass three of the warmest months of the year in a state of torpidity. They are occasionally injurious to the gardener and farmer, by destroying roots and seeds, although their chief food is composed of earth worms, grubs and other noxious animals. In this State, we have observed species illustrative of four genera, namely, *Condylura*, *Scalops*, *Sorex* and *Otisorex*.

GENUS CONDYLURA. *Illiger.*

Muzzle elongated, with radiating cartilages. Incisors six above and four below; the two intermediate above, largest; spoon-shaped. Cheek teeth fourteen above, sixteen below. Ears none. Feet five-toed; anterior claws formed for digging.

Obs. This genus was established by Illiger for the reception of a singular little animal from North America, which had been hitherto described as a mole and as a shrew. The name, although founded on an accidental character, it has been found convenient to retain. We have met with but one species in this State.

THE COMMON STAR-NOSE.

CONDYLURA CRISTATA.

PLATE IV. FIG. 1.—(STATE COLLECTION.)

Sorex cristatus. LINN. Ed. 12, p. 73.
Long-tailed Mole. PENN. Syn. Quad. Fide Erxleben.
Talpa longicaudata. ERXLEBEN, Syst. p. 118.
Radiated Mole. PENN. Hist. Quad. Vol. 2, p. 232, (fig.)
Taupe de Canada. DELAFAILLE, Essai sur la Taupe.
Long-tailed Mole. PENN. Arctic Zool. Vol. 1, p. 140.
Condylure à longue queue. DESMAREST, Mamm. p. 158.
Condylura cristata. HARLAN, Fauna Am. p. 36.
C. longicaudata. ID. ib. p. 39.
The Star-nose Mole. GODMAN, Am. Nat. History, Vol. 1, p. 100, (fig.)

Condylura longicaudata. RICHARDSON, F. B. A. p. 13.
C. macroura. ID. ib. p. 284, pl. 24.
C. longicaudata and *macroura.* EMMONS, Mass. Report, 1840, p. 17.

Characteristics. Color of a nearly uniform brownish black. Tail more than half the length of the head and body. Length 7.

Description. Body cylindrical throughout, without any very distinct neck. Fur exceedingly dense and fine. Head with a slender elongated muzzle, terminating in a vertical circular disk, of from eighteen to twenty subequal cartilaginous fibres; of these, the two superior and four inferior are shortest, and not in the same plane with the others. These fibres are 0·2 long. The eyes exceedingly minute, and not easily discovered; but they may be found by examining the space above the angle of the mouth, where three or four rigid subequal hairs are apparent. Whiskers 0·4 long, light-colored at the tips, and curved forwards. A large orifice in place of an external ear, not projecting above the skin. Fore feet short, with broad robust palms; on their upper surface a series of horny scales, somewhat analagous to those on the feet of birds; on the edges of the palms, these scales are accompanied with rigid hairs. The interior of the palms with small circular scales. The fingers gradually increase in size to the fourth from the exterior; the outer equals the second from the interior. The claws are flattened, obtusely pointed, and channelled beneath. Hind feet placed far back, and quite feeble; the toes distinctly separate and scaly; the claws long, sharp, compressed, and channelled beneath. Tail sub-cylindrical, sparsely hairy, permitting the scales to be seen beneath, and pencilled at its tip. In cabinet specimens, the tail often appears knotted throughout, and strangulated at its base. The jaws present the remarkable peculiarity of two spoon-shaped incisors above and four beneath. In the upper jaw, on each side of these, are two other incisors, the first of which is long, and resembles a canine tooth; the other is separated by a small interval from the preceding, is very small, conic and compressed. The incisors of the lower jaw are spoon-shaped, approximated and subequal. The cheek teeth in both jaws vary much in form and size, the first of the lower jaw being long and pointed like a canine tooth.

Color, throughout of a nearly uniform deep brownish black, varying somewhat according to the light in which it is viewed. The base of all the fur is of a deep slate color; beneath of a lighter hue, and may be termed ashen or plumbeous. Feet whitish. I have noticed a specimen which was of a uniform soiled white.

Total length,	7·5.	Hind leg,	1·1.
Length of tail,	2·8.	Breadth of palm,	0·4.
Of fore feet,	0·7.	Girth of body,	3·5.

The name given by Illiger, which was founded on a figure which exhibited the knotted appearance of the tail in a desiccated specimen, and therefore not characteristic, it has been nevertheless found convenient to retain, as designating a remarkable generic type. Pennant, in his Synopsis of Quadrupeds, 1771, published a notice and figure of what he terms the

long-tailed mole. Linnæus, in his 12th edition, 1776, published his description of the *Sorex cristatus.* The following year, Erxleben gave the name of *longicaudata* to Pennant's mole. We suppose that all these refer to the same species, Linnæus having described from an injured specimen. In the third edition of the Synopsis, (possibly in the second, which we have not seen,) which was published under the title of the History of Quadrupeds, Pennant introduces the Linnean *cristatus*, with a deplorable figure, and adds his long-tailed mole with a figure scarcely superior to the other. From his account, it is apparent that he described an immature star-nose for the *cristatus.* In his Arctic Zoology, having in the interval received specimens from this country, he describes some additional particulars; of these the most important diagnostic character attributed to the *cristatus*, is "toes of the hind feet closely connected;" and yet Desmarest, *Op. cit.* who has given a detailed description, expressly states "Pieds de derrière, etc." "Hind feet with the toes deeply divided, all the toes free;" and this accords with our own observations. The account of the *longicaudata* by Desmarest, is evidently copied from Pennant by some culpably careless transcriber.

From these observations, we would infer, 1st, that the *cristatus* of Linnæus is the only species yet discovered in this country, and is identical with the *long-tailed mole* of *Pennant;* 2d, that the name of *cristatus* is entitled to priority; 3d, that if the name *longicaudata* ever appears in the systems, it must be attributed to *Erxleben*, and not to *Pennant.*

The *C. macroura* of Harlan, although adopted, described in detail and figured by Richardson, we cannot, after a careful comparison of descriptions, acknowledge to be a distinct species. It is well known that the tail undergoes, at certain seasons, changes in shape and bulk; and species founded on such characters should be received with great reserve. We have specimens of the common *star-nose* differing in no respect from the *macroura*, except in its tail not being quite as much dilated as in the figure of Richardson. It is proper, however, to add, that we have not been enabled to examine the individual from which Dr. Harlan drew up his description; and his account purports to have been derived from a cabinet specimen.

The Star-nose burrows in moist places near the surface, forming elevated ridges like the Shrew-mole, and chambers for rearing their young. These are most numerous near the borders of streams. When observed in confinement, they continually attempt to hide themselves by digging, and the cartilaginous tendrils around their nose are in perpetual motion. Godman states that they feed readily on flesh, either raw or cooked, and exhibit no willingness to eat vegetable matter.

The Star-nose is abundant throughout New-York, where it is occasionally called the *Button-nose Mole.* Its geographic limits are not yet established. It is, however, known at present to be found from Hudson's Bay to Virginia.

GENUS SCALOPS. *Cuvier.*

Muzzle elongated and simple, flexible, cartilaginous. Eyes minute, and scarcely visible. No external ears, but simply a minute aperture. Feet short, five-toed; the hand broad, with fingers joined together by the integuments to the last phalanx; the claws long and flat. Hind feet slender, with delicate hooked nails. Teeth: Incisors, $\frac{2}{2} - \frac{3}{4}$*; cheek teeth,* $\frac{1\,3}{1\,2} - \frac{2\,0}{2\,0} = 34 - 46$. *A musky gland near the vent.*

THE COMMON SHREW-MOLE.

SCALOPS AQUATICUS.

PLATE IV. FIG 2.—(STATE COLLECTION.)

Sorex aquaticus. LIN. 12 ed. p. 74.
Brown Mole. PENN. Arct. Zool. Vol. 1, p. 141.
S. aquaticus. SCHREBER, Saugthiere, pl. 158, (indifferent.)
S. canadensis. HARLAN, Fauna Americana, p. 32.
The Shrew-mole. GODMAN, Am. Nat. Hist. Vol. 1, p. 84, fig. 3.
Scalops canadensis. RICHARDSON; F. B. A. Vol. 1, p. 9.
Shrew-mole. EMMONS, Massachusetts Report, 1840, p. 15.

Characteristics. Fur glossy, and like velvet; its most usual color silvery grey, brown. Length, 6 – 8 inches. — VAR. *a*, bright tawny; *b*, hoary.

Description. Body cylindrical, without any distinctly apparent neck. Fur thick, velvety and lustrous. Head small, with its muzzle elongated to a point. The muzzle about a quarter of an inch long, and naked towards its extremity, which is truncated. The nostrils are oblong, and placed just above its smooth truncated extremity. Eyes exceedingly minute, and completely concealed among the fur. No external ear; the auditory opening entirely concealed in the fur about three-quarters of an inch behind the eye, and just admitting the point of a pin. Fore feet apparently naked, but in fact covered with short white hairs. The five phalanges are united at the base of the claws, which are large, white, flat, slightly curved, and brownish beneath near their bases. According to Godman, it is furnished exterior to the thumb with an additional bone articulated to the wrist, and a similar rudimentary one on the external edge of the hand. Hind feet slender, thinly covered by hair, and with small white compressed claws. Tail thickest in the middle, tapering to a point, and sparsely furnished with short hairs. The descriptions of the teeth, as given by various authors, vary not only in the names given to the different kinds of teeth, but likewise in the total number; the incisors, for instance, are confounded with the canines, these latter with the molars. Hence, when the second cheek tooth on each side is lost, the first, which is closely in contact with the incisor, is considered as a second incisor; and thus confusion arises from the inspection of a single head, or from immature or imperfect ones. Desmarest accordingly assigns thirty teeth as the total number; F. Cuvier thirty-six, in which he is copied by Godman; and Richardson, with a fully developed skull, enumerates forty-four. We have but

once seen a skull with this number; and this formula, which has been erroneously printed, has, by another error, been applied to the star-nose.

Color. The entire animal is covered with a beautiful glossy fur of silvery grey brown, somewhat lighter about the head, where it assumes a slight yellowish tinge; but this is far from being a constant character. Muzzle of a delicate flesh color. Tail and feet whitish. Varieties are not uncommon, of a uniform bright tawny or orange, and occasionally hoary.

Total length,	6·0.
Tail,	1·0.

This little animal, from its appearance and habits, is commonly called a *mole;* but from this it is widely different. It has the burrowing habits of the common mole of Europe, but does not exclusively occupy the vicinity of rivers and water courses, as its name would seem to imply. It may naturally prefer moist places; for the earth is more easily excavated in such situations, and its favorite food, the earth worm (*Lumbricus terrenus*, Say,) is there found in the greatest abundance. They have also been observed in the dry sandy pine barrens of New-Jersey, in search of the larvæ of ants. Their burrows are usually from one to three inches from the surface, although occasionally much deeper. He is well known as the pest of gardeners, defacing the smooth walks, and injuring the appearance of the beds. It may well be doubted, however, whether the good he does in destroying grubs, worms, etc. does not more than compensate for the injury he is supposed to occasion to roots and germinating seeds. It is asserted that he has a great aversion to the castor-oil plant (Palma Christi), and that he will avoid gardens in which they grow. Our own experience would lead us to attach little importance to this remedy.

The Shrew-mole, for its size, is remarkably strong, and is capable of domestication. In eating, it employed its flexible snout to thrust food into its mouth, and frequently burrowed in the earth in order to eat its food undisturbed. An interesting account of the habits of the Shrew-mole is given by Dr. Godman,* to which we refer the reader.

We take this opportunity to state, that the existence on this continent of the true mole of Europe, has frequently been asserted and denied. Dr. Harlan, in his *Fauna*, p. 43, has published from the manuscripts of Bartram, notes of an animal which may have reference to a true mole. Of this several varieties are noted, which, unless Bartram had the shrew-mole in view, would seem to indicate the existence of a very common species. It is to be regretted that Bartram's notes are silent respecting the dentition, which would have settled all doubts on the subject. Godman, Vol, 1, p. 106, discredits its existence; and the translator of the American edition of Cuvier's *Règne Animal*, coincides with this opinion. One of the most recent writers on our Mammalia, states, however, that there are several true moles in the

* Rambles of a Naturalist, by J. D. Godman, Philad. 1833.

collection of the Zoological Society of London, undoubtedly from America, but the particular district was not known.

The Shrew-mole has a wide geographical range, being found from Carolina to the fiftieth degree of north latitude, and from the Atlantic to the shores of the Pacific.

GENUS SOREX. *Linneus.*

Cutting teeth, $\frac{2}{2}$; *the upper curved and notched at the base. Head elongated; snout produced and moveable. Ears short, rounded, broader than long, concealed, occasionally not elevated above the skull. Feet short, with five nails; phalanges small, separate, with feeble hooked nails. A series of glands, exhaling a strong odor, along the flanks. Cheek teeth,* $\frac{16-20}{10}$.

Obs. This genus contains some of the smallest of our quadrupeds. The English translator of Cuvier's *Règne Animal*, asserts that no genuine Shrews are to be found, except on the ancient continent; an assertion which is contradicted by the fact that thirteen species have been described in North America, and when farther investigations are made, the number will probably be much increased. It will be found that the characters of the genus will require careful revision, and several small but distinct groups will be established. The habits of the animals of this genus are nocturnal, and they burrow for the most part in the ground like the shrew-mole. All are said to be fond of the water, swimming with great ease, and diving well.

DE KAY'S SHREW.

SOREX DEKAYI.

PLATE V. FIG. 2.—(STATE COLLECTION.)

Sorex dekayi. BACHMAN, Acad. Sc. Vol. 7, p. 377, pl. 23, fig. 4.

Characteristics. Uniform dark bluish throughout. Chin light brown. Feet reddish brown. Total length 5 to 6 inches.

Description. Body subfusiform, tapering gradually to the snout, which is elongated, emarginate, and covered near the extremity with short hairs. Head small; nostrils terminal. Eyes visible, and 0·6 distant from the snout. No projecting external ear. Whiskers numerous, whitish; the longest were five-tenths of an inch long. The fore feet 0·5 long, sparsely hairy, with scaly phalanges; the internal toe or thumb is articulated high up, and is shorter than the external; the second and fourth subequal; the middle longest; claws short, white, and feebly channelled beneath for two-thirds of their length from the tips. Base of the claws enlarged, and compressed laterally. Hind legs placed very far back, 0·6 long, and sparsely hairy; the three middle claws subequal. Tail very slender, subquadrate, with

adpressed hairs, and slightly pencilled at the tip. Teeth white at the base, piceous at the tips. Dental formula: Incisors, $\frac{2}{2}$; cheek teeth, $\frac{16}{16} = 30$. (Bachman, in his valuable monograph cited above, attributes 18 cheek teeth to this species.) Above, the incisors are incurved, pointed, channelled behind, with a broad base dilated posteriorly, and furnished with a distinct point; the four succeeding cheek teeth on each side small, with their external points most elevated; the first of the remaining jaw teeth largest of all, with four and occasionally five distinct points; the remainder smaller, and irregularly pointed. In the lower jaw, the incisors are long, not contiguous, and projecting horizontally from the jaw; they are curved, with pointed tips, and channelled within; the external edges are sharp, with two and occasionally three distinct emarginations, the base laterally compressed. The first jaw tooth is a small pointed prism, lying immediately on the base of the incisor, and directed forwards; the next is still over the root of the incisor, somewhat larger, with an oblique cutting edge; the third is five-pointed, and largest of all; the last is somewhat larger than the second.

Color. Uniform glossy slate, or if we take a more definite standard, resembling the fur of the star-nose. Beneath, merely a shade lighter; and in particular lights there is no perceptible difference in the color, the whole appearing hoary and lustrous. Chin and nose light brown. Feet flesh-colored.

Length of head and body,	4·8.	To the end of the hairs,	0·9.
Length of tail,	0·8.	Girth,	2·7.

I am indebted to Mr. Bell for an opportunity of examining other specimens of this Shrew, from Rockland county. In one, the length of the head and body was 3·5; of tail, 0·7. In others, the dimensions were somewhat smaller. The specimens from which our description is taken, were obtained from Queens county, and were described and exhibited before the Lyceum of Natural History nearly fifteen years ago. I then gave it the name of *concolor*, but the description was never published. Dr. Bachman, who examined the same specimen, gave the present name, which, by the just and rigid rule of priority, must be preserved. It is nearly allied to *brevicaudus*, but is larger and more robust in its form.

This Shrew is found in Albany county, and in the southern parts of the State. Its geographical range along the Atlantic extends from Massachusetts to Virginia.

THE SHORT-TAILED SHREW.

SOREX BREVICAUDUS.

(STATE COLLECTION.)

Sorex brevicaudus. SAY, Long's Exped. Vol. 1, p. 164.

Short-tailed Shrew. BACHMAN, Ac. Sc. Vol. 7, p. 381. HARLAN, Fauna. p. 29. GODMAN, Am. Nat. Hist. Vol. 1, p. 79, figure. KIRTLAND, Ohio Report, p. 175. LINSLEY, Am. Jour. Sc. Vol. 39, p. 388. EMMONS, Mass. Rep. 1840, p. 13.

Characteristics. Blackish, plumbeous above. Nose livid brown. Tail nearly as long as hind feet. Total length, 4·0 – 4·5.

Description. Fur very long. Head large; eyes very minute. Fore feet naked, the hind ones sparsely covered with hair. Nose emarginate. Auditory foramen large, with two distinct half divisions, sparsely hairy. Nails nearly as long as the toes. Tail sparsely covered with hair. Teeth: Incisors, $\frac{2}{2}$; cheek teeth, $\frac{1}{1}\frac{3}{0} = 32$.

Color. Above, blackish lead when looked at from before, and silvery lead when viewed in an opposite direction: paler beneath. Teeth black; nose livid brown; feet white.

Length of head and body,	3·2 – 3·5.
Tail,	0·9 – 1·0.

I have seen several specimens of this animal from the opposite shore of New-Jersey, and have heard of its capture near Albany, but have never had the fortune to meet with it in this State. Mr. Linsley, in the work cited above, states that he has taken it in Connecticut, answering exactly to the description given by Godman.

Since the above was written, I have had an opportunity of examining a recent specimen from Queens county, which I refer to this species with the following description:

Rostrum robust, broad. Whiskers numerous, long, radiating; those along the margin of the mouth 0·5 long. A projecting fleshy septum just anterior to the two upper incisors, and extending nearly between them. Fur thick, moderately long, dark brown, very sparse around the region of the mouth and on the extremities, rather allowing the skin beneath to be seen; rather more dense on the tail. Nose dark brown, bifid. Eyes with a small naked space around them, 0·55 distant from the nose. Auditory hole large, transverse, narrowed beneath, naked, with an oblique septum across the upper half, and a small lobe near the middle, about 0·5 posterior to the eye. Fore feet 0·5 long; three toes subequal, longest; outer toe slightly longer than the inner. Tubercles on the palms six; two in a line behind the inner toe, and two behind the outer; the fifth between the base of the second and third toes, counting from the outside, and the sixth is placed at the base of the fourth toe. On the hind feet, the tubercles are similar in number and situation, but are larger and more distinct. When the animal lies on its back, with the hind legs extended, the claws reach beyond the middle of the tail. Tail cylindrical, very slightly tapering.

Total length,	4·00.
Of the tail,	0·75.
Hind feet,	0·75.

THE SMALL SHREW.

SOREX PARVUS.

Sorex parvus. SAY, Long's Exped. Vol. 1, p. 163. LINSLEY, Am. Jour. Vol. 39, p. 338.
Small Shrew. GODMAN, Am. Nat. Hist. Vol. 1, p. 78, pl. fig. 2.

Characteristics. Color brownish ash above, ash beneath. Tail one-third the length of head and body. Total length 3·0 – 3·5.

Description. I have not had an opportunity of examining this species; but as it has been found in Connecticut, it will in all probability be detected in this State. We subjoin the description given by Say, the original describer: "Body above brownish cinereous, beneath "cinereous; head elongated; eyes and ears concealed; whiskers long, the longest nearly "attaining the back of the head; nose naked, emarginate; front teeth black, lateral ones "piceous; feet whitish, five-toed; nails prominent, acute, white; tail short, sub-cylindric, of "moderate thickness, slightly thicker in the middle, whitish beneath. Length of head and "body, 2·4; of tail, 0·75."

Richardson, p. 8, states that a specimen obtained at Behring's Straits, is probably to be referred to this species: "Dark brownish grey above, and grey beneath; length of head and "body 2·3, tail 1·0."

Mr. Linsley, *Op. sup. cit.*, describes his *parvus* with the following dimension: "Head and "body 2·0, tail 0·75." In a letter to me, January, 1842, he states, "though a trifle shorter "than your *Otisorex platyrhinus*, it was larger in bulk; nevertheless it could not have weighed "over 50 – 60 grains, the otisorex weighing 47 grains. The *parvus*, I am satisfied, could "not have been the young of *dekayi* or *brevicaudus*, from his peculiar construction being "wholly unlike either of the other three species; besides, I have both the old and young of "the latter."

FORSTER'S SHREW.

SOREX FORSTERI.

PLATE XXI. FIG. 3.

American Shrew. FORSTER, Phil. Trans. Vol. 62, p. 3, 331.
Sorex forsteri. RICHARDSON, Zool. Jour. 1828. GAPPAR, Zool. Jour. Vol. 5, p. 201.
Forster's Shrew-mouse. RICHARDSON, F. B. A. Vol. 1, p. 6.
Sorex forsteri. BACHMAN, Ac. Sciences, Vol. 7, p. 386, pl. 24, fig. 6.

Characteristics. Small; dark cinereous, tipped with brown; beneath cinereous. Fur short. Ears broad and hairy. Tail nearly as long as the body. Length four inches.

Description. Body slender. Nose elongated and divided at the tip. Ears somewhat shorter than the fur, and concealed beneath it. Whiskers long, and white and black. Fur fine and short. Feet slender, with five white and slender toes. Tail foursided, with a slight pencil of hairs at the tip. Teeth piceous at the tips, as in the most of the species. Dental formula: Incisors, $\frac{2}{2}$; cheek teeth, $\frac{1\,1\,3}{1\,1\,0} = 32$. The two medial incisors above, with a lobe behind; beneath, the two medial incisors with two obtuse lobes.

Color. Fur, for two-thirds of its length, dark ash above, and brown at the tips; beneath, lighter ash. Feet flesh-colored, with short yellowish white hairs. Tail dark brown above, soiled white beneath.

Total length,	4·0.	Of tail,	1·5.
Length of head and body,	2·5.	Of head,	0·8.

This hardy little animal is found as far north as the sixty-seventh degree of latitude, and was first noticed by Forster in the work cited above, notwithstanding the English translator of Cuvier asserts "that no genuine Shrews are to be found except on the ancient continent." The tracks of this species are seen frequently during winter on the snow; and this has been noticed by Richardson, even when the thermometer stood at 40 to 50 degrees below zero. They are found in all parts of the State, but we are as yet uncertain as to their southern range.

THE CAROLINA SHREW.

SOREX CAROLINENSIS.

PLATE XXI. FIG. 2.

Sorex carolinensis. BACHMAN, Ac. Nat. Sc. Vol. 7, p. 366, pl. 23, fig. 1.

Characteristics. Uniform iron grey. Tail short, flat, nearly half the length of the head. Larger than the preceding.

Description. Body rather robust. Snout long and slender, with a bilobate tip. No external ears, but simply an auditory aperture. Whiskers long, and in some lights whitish. Eyes exceedingly minute. Fore feet rather robust, covered sparsely with hairs; hind feet more slender. Nails moderate, subequal. Tail flat, with a small thin pencil at tip. Dental formula: Incisors, $\frac{2}{2}$; cheek teeth, $\frac{8}{12} = 36$; all piceous at their tips.

Color. A bright lustrous iron-grey over the surface, the base being of a slate color. Nose and feet flesh-colored. Head and body 4·0. Head 1·0. Tail 0·4.

We have referred, with some doubts, specimens of a Shrew commonly found in this State, to this species. In this we have followed Bachman, until we had an opportunity of examining a specimen in a living state. Such an occasion has not yet presented itself. In the only one which I had an opportunity to examine with any attention, the number of cheek teeth exceeded those assigned to this species by Bachman. According to this author, their nests are about a foot under ground, and composed of fibres of roots and grasses. They feed on worms, larvæ of insects, etc. This species requires farther examination.

(*EXTRA-LIMITAL.*)

S. cinereus. (BACHMAN, Ac. Sc. Vol. 7, p. 373, pl. 23, fig. 3.) Dark iron-grey above, silver grey beneath; teeth 26; length 3·3. *Carolina.*

S. richardsonii. (Id. ib. p. 383, pl. 24, fig. 5.) *S. parvus.* (RICHARDSON, Vol. 1, p. 8.) Rusty brown above, beneath cinereous; total length 4·2; teeth 32. *N. W. Territory.*

S. cooperi. (Id. ib. p. 388, pl. 24, fig. 7.) Dark brown, beneath ash; nose long and pointed; tail as long as the head and body; total length 3·5. *N. W. Territory.* The smallest quadruped yet observed in the United States.

S. fimbripes. (Id. ib. p. 391, pl. 24, fig. 8.) Dark brown above, fawn-colored beneath; feet broad, fringed at the edges; tail a little shorter than the body; total length 3·9. *Pennsylvania.*

S. palustris. (Richardson, F. B. A. p. 5.) Blackish hoary above, lighter beneath; total length 6·2. *Arctic Regions.*

GENUS OTISOREX.

Ears large and prominent, beyond the fur. Nose elongated. Eyes distinct. Tail quadrangular. Teeth, 33.

Obs. We have ventured to propose this group, founded upon a northern and southern species, both exceedingly small.

THE BROAD-NOSED SHREW.

Otisorex platyrhinus.

PLATE V. FIG. 1.—(STATE COLLECTION.)

Characteristics. Dark brown, paler beneath. Total length, four inches.

Description. Head large. Nose much elongated, and flattened vertically; bordered on each side above with long whiskers, the tips of the most posterior extending beyond the ears; a few shorter ones on the lower jaw. Extremity of the muzzle naked and blackish, bilobate at the tip; nostrils small, lateral. Eyes small, but distinct and black, equi-distant between the tip of the nose and the margins of the ears. Ears very large, rounded and membranaceous, sub-angular on the upper margin, sparsely covered within and without with long hairs; a transverse membranous septum across the auditory foramen, thinly covered with hair. Fore feet feeble, pentadactyle, 0·5 long. Toes separate, covered with short, shining, whitish hairs; internal shortest; the outer, second, fourth and third, counting from within, successively longer. Nails moderate, slightly curved. Hind feet slender, 0·8 long, sparsely covered with light rufous hairs. Tail quadrangular, slightly constricted at its base, tapering to a point, covered thinly with short hairs, but not concealing the annulations. Fur over the whole body quite long and thick, varying from 0·2 to 0·4 inches. Tongue long, sublinear, papillose with transverse rugæ. Weight, 45–50 grains. Skull elongated. Teeth minute, tinged with piceous at their tips. Dental formula: Incisors, $\frac{2}{2}$; cheek teeth, $\frac{1\,8}{1\,6} = 32$. In the upper jaw the incisors are short, with broad and dilated bases: They have a double tip, the posterior being small, distant and tubercular; the five succeeding are small, the fifth being, however, so exceedingly minute as to escape observation, unless aided by the lens; the sixth with a trifid tip, and a small dilated tubercular heel; the seventh and eighth sub-

equal, larger than the preceding, with the heel more robust; the last very small, with a single colored tip on its anterior margin. Beneath, the incisors are in a line with the lower jaw, with two distant tubercles on the outer margin: The first cheek teeth small, and lying on the base of the incisor, with a single tip; the second larger, with two small eminences; the third largest of all, and with three very acute tips; the two succeeding similar in shape, but smaller.

Color. Dark cinereous, slightly tinged with dusky rufous, particularly on the upper part of the muzzle and inferior portion of the neck; beneath, ash grey.

Length of head and body,..	2·5.	Of head,.....	0·9.
Length of tail,.....	1·6.	Height of ear, ...	0·2.

I am indebted to Mr. J. G. Bell, a zealous and acute observer, for the opportunity offered of making the preceding description. It was captured last summer at Tappan, Rockland county, in the cellar of a dwelling house, having taken up its abode between the stones of the foundation. It was exceedingly agile; and when excited, emitted a shrill, twittering squeak. It ate greedily of fresh meat, but died in the course of a few days. Through the politeness of my friend, the Revd. J. H. Linsley of Elmwood Place, Connecticut, I had an opportunity of examining another specimen, which was obtained from a log in the forest in winter, near Stratford. According to Mr. Linsley, it weighed 47 grains; and he adds, "it is the smallest "quadruped I have seen, and probably the least in America."

It appears very closely allied to the Long-nosed Shrew of Bachman, but differs in its general color, its larger size, and its proportionally longer tail. Dr. Bachman inclines to the opinion that his species is aquatic in its habits.

(*EXTRA-LIMITAL.*)

O. longirostris. (Bachman, Ac. Sc. Vol. 7, p. 370, pl. 23, fig. 2.) Chesnut; nose elongated; total length 2·8. *South Carolina.*

FAMILY III. URSIDÆ.

Six incisors in each jaw. Teeth of three kinds. Feet with strong claws. Nose moveable, adapted for excavating. Walk on the soles of the feet. Carnivorous and frugivorous. Some species hybernate.

This group comprises the Bear, the Raccoon, Badger and Wolverine of this country. They can scarcely be said to be prejudicial to man.

GENUS URSUS. *Linneus.*

Head large; body and limbs large and powerful. Covered with long shaggy hair. Grinders varying in number, the four last large and tubercular. No glandular pouch under the tail, which is very short. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *molars,* $\frac{12}{14} = 42$.

THE AMERICAN BLACK BEAR.

URSUS AMERICANUS.

PLATE VI. FIG. 1.

Ursus americanus. PALLAS, Spicileg. Zool. Vol. 14, p. 6.
Black Bear. PENN. Arct. Zool. Vol. 1, p. 57.
U. americanus. HARLAN, Fauna, p. 51. GODMAN, Am. Nat. Hist. Vol. 1, p. 114. Plate.
Ours gulaire. GEOFFROY, Mem. Mus. (Variety.)
The Black Bear. EMMONS, Mass. Rep. 1840, p. 20.

Characteristics. Black or brownish black; a soiled brown or yellowish patch on each side of the nose. Facial outline somewhat arched. Young with hair wavy or curled.

Description. Ears high, oval, rounded at the tips, and distant. Soles of the feet short; the hair projects slightly beyond the claws. Fur long, straight, shining and rather soft. Tail very short. Claws short, blunt, somewhat incurved.

Color. Beside the general black color of the body, which is occasionally light brown, verging in some instances into soiled yellowish, the sides of the nose are of a fawn color; occasionally a white dash on the forehead or throat, and sometimes a small spot of the same is seen above the eyes. Length 4 to 6 feet.

The Bear, once so numerous in this State, is now chiefly to be found in the mountainous and thinly inhabited districts, where they breed. The female, after a gestation of about one hundred days, brings forth two cubs. It does not eat animal food from choice, and never unless pressed by hunger: it prefers berries and fruits. In the forests in the northern parts of the State, a tornado will sometimes sweep through a region, prostrating the pines to an extent of many miles. In the course of a few years, the wild cherry tree springs up in great numbers on this tract; and in the fruit season, it becomes the resort of numerous bears.* It also feeds upon the whortleberry, grapes, honey, persimons (Diospyros), and roots of various kinds. Its fondness for sweet things is evident whenever it enters an apple orchard, invariably selecting the sweetest kinds. It will also devour eggs, insects, and small quadrupeds and birds; but when it has abundance of its favorite vegetable food, will pass the carcase of

* The effects of such a tornado we observed in Hamilton county, in the summer of 1840, near Eighth lake. The course of the *windfall*, as it is popularly called, was from west to east. It extended thirty miles, with a breadth varying from half a mile to two miles. This occurred fifteen years ago. It has been subsequently burned over, and abounds in poplar, white birch, wild cherries, wild raspberries, etc., which attracted to this district great numbers of deer and numerous bears.

a deer without touching it. The Bear is an imitative animal; and hence, when it meets a man, it will rise on its hind legs, but is apparently soon satisfied with the comparison, and endeavors to make its escape. It is a great traveller, and when pursued by tracking, has been known to perform long journeys. It never makes immediately for its retreat; but approaches it in a circling manner. A bear was started near Schroon some years since, and after a chase of eighteen days, was finally killed. Although seldom seen during the chase, yet he appeared to be fully aware that he was an object of pursuit, and the worn and lacerated condition of his feet testified to his exertions to escape. They are numerous along the borders of the Saranac, and in the mountainous regions of Rockland and Greene. Occasionally they invade the enclosures of the farmer, in search of potatoes and indian corn. Their depredations are, however, speedily checked; for they are timid, and will never attack a man, unless previously wounded, or in defence of their young. Some of the hunters imagine that there are two varieties of the common Black Bear, viz. the short-legged and the long-legged; but others inform me that the difference is owing entirely to the fact that some are fatter and more robust, which produces an apparent difference in the length of their legs. The Yellow Bear of Carolina, and the Cinnamon Bear of the northern regions, are varieties of this species. In this State, they retire with the first fall of snow, to caverns, or to the hollow of some decayed tree, or beneath a prostrate tree, during the winter, and pass three or four months in a state of torpidity. In more southern latitudes, the hybernation is of shorter duration, and ceases to occur when the mildness of the winter enables them to procure food. They are fat when they enter their winter quarters, and much emaciated when they leave it in the spring. Indeed this condition of fatness is so necessary, that when the supply of food is cut off, instead of retiring to winter quarters, they migrate southwardly to warmer regions. Hence great numbers are occasionally known to enter our territory from the north, composed entirely of lean males, or females not with young.

The flesh of the bear is savory, but rather luscious, and tastes not unlike pork. It was once so common an article of food in New-York, as to have given the name of *Bear market* to one of the principal markets in the city. The female goes with young seven months, bringing forth two young in February or March. The oil sells for one dollar per pound, and the skin from four to twelve dollars, according to its value.

The engraving illustrative of this species was taken from a very large individual shot on the Kaaterskill mountains, Greene county, during the winter of 1839. It measured six feet and a half from the nose to the tip of the tail; and at the foreshoulders, measured three feet two inches from the ground.

(*EXTRA-LIMITAL.*)

U. ferox. (Say, Long's Exped. 2, 244. Richardson, pl. 1 and 2.) Larger than the preceding color white, brown and black intermixed; facial outline nearly straight. *Northern and western regions.*

U. maritimus. (Godman, pl. fig.) White; facial outline somewhat convex; ears small; soles of the feet very long. *Arctic Sea.*

GENUS PROCYON. *Storr.*

Head short, triangular, with a fox-like appearance. Muzzle tapering, and projecting considerably beyond the mouth. Ears small. Tail long, bushy, not prehensile. Stand on the heel of the hinder leg, but walk on the toes. Mammæ six, ventral. Feet five-toed, with large and strong nails. A glandular pouch on each side of the vent. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *molars,* $\frac{12}{12} = 40$. *Nocturnal.*

THE RACCOON.

PROCYON LOTOR.

PLATE VI. FIG. 2.—(STATE COLLECTION.)

LINNEUS, Beskrifnung pa ett americanst djur. Vetensk. Acad. Handl. 1747, p. 277.
Ursus americanus, cauda elongata. LIN. Analect. Transalp. Tom. 2, p. 35.
Ursus lotor. LIN. ed. 12, p. 35. ROLOFF, Description d'un Quadrupede d'Amerique. Hist. de Acad. de Berlin, 1756, p. 149. SCHULTZE, Bemerkungen über den waschhären. Hamburg, 1787.
Raccoon Bear. PENNANT, Arct. Zool. Vol. 1, p. 69.
Procyon lotor. HARLAN, Fauna, p. 54. GODMAN, Am. Nat. Hist. Vol. 1, p. 163, (figure.)
P. id. RICHARDSON, F. B. A. Vol. 1, p. 36.
The Raccoon. EMMONS, Mass. Report, 1840, p. 25.

Characteristics. Brownish; a broad black patch across the eyes. Tail bushy, and ringed with black and grey. Total length 2 to 3 feet.

Description. Body rather low on the legs, and covered with long bushy hair. Ears erect, with rounded tips. Head rounded, terminating in a pointed muzzle. Feet with five toes, furnished with sharp curved claws. Soles with five stout tubercles. Pupils round. Female larger than the male. Hair on the legs and feet short.

Color varies somewhat with age, sex and season. In the very fine specimen in the State Collection, the color above is a dark grey mixed with black. Ears dingy white; muzzle black; the chin and space above the snout reddish white. The broad black band across the eyes unites under the throat; the upper edge of this band is margined with white over the cheeks and eyes. Hair beneath long and hoary. Tail annulated, with twelve alternate bands of black and light, fulvous; tip black. In the female, the black markings on the body and tail are of a deeper hue. Total length 36 inches; tail, 10.

This is a well known animal, found in every part of the State. It has been quaintly described as having the limbs of a bear, the body of a badger, the head of a fox, the nose of a dog, the tail of a cat, and sharp claws by which it climbs trees like a monkey. The Raccoon is a restless, mischievous animal, feeding on wild and domesticated fowls, frogs, lizards, fish and insects. From its fondness for water, it is most usually found in low wooded swamps, making its lair in some hollow tree, and producing four to six cubs at a litter about the beginning of April. It is susceptible of domestication. Its fur is an article of considerable value

in commerce, being used principally in the fabrication of hats. Its flesh, when young and tender, is savory, tasting not unlike pig; but in adults, is rank and disagreeable. Occasionally the raccoon commits great ravages among indian corn, while it is in a milky state; and this, together with his occasional descents upon the barn-yard, scarcely compensates the farmer for his zeal in digging up and devouring grubs or larvæ of injurious insects.

The Raccoon is found all over North America. It has been seen as high as 60° north on the Pacific Ocean. Its southern limits are not so well defined, although it is said to exist as far as Paraguay; it may possibly be confounded with another species, which, however, has not yet been clearly identified.

(*EXTRA-LIMITAL.*)

Genus MELES, *Brisson.* Body robust, low on the legs; ears short and wide; anterior nails very large. Tail short, with a glandular pouch beneath. Incisors, $\frac{6}{6}$; canines, $\frac{2}{2}$; molars, $\frac{10}{12} = 38$. Burrowing; nocturnal.

M. labradoria. American badger. (GODMAN, 1, 176, fig. RICH. pl. 2.) Hoary; a white stripe down the forehead; a greyish brown or blackish patch includes the eye, and extends to the tip of the nose. Tail 3. *Northern regions. Plains of Missouri.*

Obs. In some parts of this State, the woodchuck (*Arctomys monax*) is called *Badger;* but I am not aware that the true Badger exists here.

GENUS GULO. *Storr, Cuvier.*

Body long, and low on the legs. Soles of the hind feet capable of being applied wholly or in part upon the ground. Tail bushy. A simple fold beneath the tail, instead of a glandular pouch. Feet five-toed, with strong hooked claws. 36 – 38 *teeth. Carniverous. Nocturnal.*

OBS. This genus is arranged by some naturalists among the *Mustelidæ,* to which indeed it bears by its dental system a close relation. The *ensemble* of its characters would seem, however, to place it in its present family, making an easy transition to the next. In the latest systematic writers, four species are noted, most of them peculiar to America. The two from North America appear to differ only in color, and are considered by many as mere varieties.

THE WOLVERENE.

GULO LUSCUS.

PLATE XII. FIG. 2. — (CABINET OF THE LYCEUM.)

Carcajou. LA HONTAN, Voyage, Vol. 1, p. 81.
Ursus luscus. LIN. 12 ed. p. 71.
Wolverene. PENN. Arct. Zool. Vol. 1, p. 66. LAWSON, Carolina, figure.
Gulo arcticus. HARLAN, Fauna, p. 60.
G. luscus. GODMAN, Am. Nat. Hist. Vol. 1, p. 185, plate.
Wolverene. RICHARDSON, F. B. A. Vol. 1, p. 41.

Characteristics. Color dark brown, passing into black, with a lighter broad band on the flanks and thighs. Tail with long pendulous hairs.

Description. Body stout and compactly made, with an arched back, and little elevated from the ground. Head small, broad, rounded, suddenly diminishing to the nose. Ears small, rounded, and nearly concealed among the fur. Eyes small. Fur loose and shaggy. The tail, which scarcely exceeds six inches, is very bushy, and covered on its sides and extremity with long pendulous hairs. Legs short and thick; toes distinct, and armed with five hooked claws. Soles of the fore feet with five, and hind feet with four tubercles.

Color. There is a great variety in the general color of this animal, varying from light cream to a deep blackish brown. Its usual color is as follows: Blackish brown, becoming deeper on the sides of the face, on the back and extremities; more or less white on the chin and between the fore legs. Hair on the tail, deep black; on the legs, brownish black. A pale crescent-shaped band over the head, between the ears and the eyes. A broad band of light chesnut along the flanks, becoming dilated on the thigh, and ascending over the rump, where it meets with a similar band from the other side. The young have a uniform downy cream-colored fur. Head and body, 24·0; tail (vertebræ), 6·0; including fur, 9·0.

Although we have not met with this animal, yet hunters who have killed them repeatedly, and knew them well, have assured us that they are still found in the districts north of Raquet lake. It is, however, every where a rare species. Prof. Emmons states that they still exist in the Hoosac mountains, Massachusetts.

The Wolverene is a very troublesome and destructive animal. Like the Fisher, it has been known to follow "a sable line" of 40 – 50 miles, destroying every trap for the purpose of obtaining the bait. Much of the fictitious history of this animal is founded on the circumstance that the name of Wolverene is also applied to the *Felis rufa*, or Bay Lynx; and in this we are to account for its habit of climbing trees, etc. attributed to it by Lawson, Buffon and others. It destroys great numbers of the smaller quadrupeds. The celebrated half breed, John Hunter, informed me that it was called *gwing-gwah-gay* by the Indians of his tribe, which he interpreted "a tough thing," or as he afterwards explained it, "a hard character," in allusion to its mischievous disposition. He assured me that he had known it to be domesticated, and employed by the Indians to catch beaver.

The Wolverene was formerly found as far south as Carolina, but its southern limits at present do not extend south of the forty-second degree. To the north, it extends to the polar seas, as high as the seventy-fifth degree of north latitude.

FAMILY IV. MUSTELIDÆ.

Comprises small carnivorous animals, with long vermiform bodies on short feet. Neck long. Ears short and rounded. Tail long, rarely bushy. Digitigrade, or walking on their toes. All diffusing a strong odor, which in some genera forms a defensive weapon. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *cheek teeth,* $\frac{8 \cdot 10}{10} = 34 - 36$.

Obs. This family embraces the animals formerly included in the old linnean genus Mustela, and familiarly known in this country under the names of Mink, Skunk, Weasel and Marten. They have been distributed by Cuvier into four, and by later writers into fifteen genera, including nearly sixty species distributed over the globe. In this State, we have the types of three genera: Mephitis, Mustela and Putorius.

GENUS MEPHITIS. *Cuvier.*

Head small, with a blunt muzzle and slight arched facial outline. Fur coarse and shaggy. Tail bushy. Fore feet robust, with five long stout claws. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *cheek teeth,* $\frac{6}{1 \cdot 0} = 32$. *Nocturnal. Burrowing. Peculiar to America.*

Obs. Were we to place reliance upon figures and descriptions, we might enumerate nineteen species; all of which are, however, considered mere varieties.

THE SKUNK.

MEPHITIS AMERICANA.

PLATE XII. FIG. 1.—(STATE COLLECTION.)

Viverra mephitis. LIN. GMEL.
Striated Weasel, and *Skunk.* PENN. Arct. Zool. Vol. 1, p. 83 and 85.
Stifling Weasel. LOSKIEL, p. 85.
Mustela americana. DESMAREST, Mamm. p. 186.
Mephitis id. SABINE, Frank. Jour. p. 653. HARLAN, Fauna, p. 70.
M. id. GODMAN, Am. Nat. Hist. Vol. 1, p. 213, figure.
M. id. var. *hudsonica.* RICHARDSON, F. B. A. Vol. 1, p. 55.

Characteristics. Black or brownish black, with an irregular whitish patch or stripe over the shoulders. Many varieties in its white marks. Length about two feet.

Description. Head small, when compared to the mass of the body; arched on its facial outline. Snout obtuse. Eyes small and black. Ears small, broad and rounded. Feet broad, and covered with hair, concealing the strong and white claws; those on the anterior extremities very robust and curved. Canines strong and conical. The great carnivorous molar above, with a large internal tubercle. Trunk of the tail of a moderate length, about half the length of the head and body.

Color. The variations in its markings are so great, that it is almost impossible to construct a specific phrase, applicable to the greatest number of these varieties. The specimen in the State Collection, which is remarkable for its size and the beauty of its fur, presents the following appearances: Deep jet black over the whole body and tail, with the exceptions to be noted. A narrow longitudinal white streak, rather more than an inch in length, commences between the eyes, and extends to the nape. Somewhat posterior to this, is a broad patch of a light cream-color, commencing abruptly, dilated on the sides of the neck, then narrowing on the shoulders where it bifurcates. It terminates dilated on the side, where the base of the hair appears tinted with flesh-color; a few straggling white hairs on the rump. Tail with white hairs, but black throughout so much of outer ends as to assume that color, except where they are entirely white and quite long. Total length, 30·0; tail (vertebræ), 9·0; tips of hairs, 13·0.

This well known and thoroughly detested animal is supposed to exist throughout the whole American continent, from the frozen regions of the north, to Paraguay and Chili. The peculiar organs of defence with which it is provided, render it highly interesting. These fetid and detestable discharges do not proceed from the bladder; nor is it distributed over its enemies by its tail, as is generally supposed. It proceeds from two anal glands, which open by ducts into the rectum, and is ejected by muscular exertion at the will of the animal; the tail being elevated at the same time, in order to prevent its coming into contact with this yellow fluid, which must be as disgusting to itself as it is deadly nauseating to its enemies. It is stated by Godman, that this fetid discharge was perceived at night to be luminous. Fortunately for the comfort of his neighbors, he appears to be a peaceful animal, and never emits his potent odors unless attacked by an animal larger than himself. Some idea of the subtle and far pervading influence of this fetor may be conceived from a fact by Dr. Wiley of Block Island, in the Medical Repository: He has distinctly perceived the smell of a skunk, although the nearest land was twenty miles distant. It is nocturnal in its habits, and is often seen sporting about on a bright moonlight night. He is a good burrower, and for this purpose his fore feet and claws are well adapted. I have seen some of their burrows running horizontally twelve to fifteen feet under ground, at about two feet below the surface. The flesh, when carefully prepared, is very sweet; but from the general repugnance to its unsavory habits, it is only eaten by the curious or the indigent. A person in my neighborhood took nineteen from one burrow, and salted them for family use during the winter. It produces from six to ten at a litter. It feeds on birds and their eggs, on frogs, and on field mice and other small quadrupeds. He is regarded as a fit subject for extermination, on account of the havoc which he causes in the poultry-house and barn-yard. His fur is coarse, and of no value as an article of commerce.

GENUS MUSTELA. *Cuvier.*

Head small, oval. Fur exceedingly fine. Tail usually long and cylindrical. One additional molar above and below.

THE FISHER.

MUSTELA CANADENSIS.

PLATE XIII. FIG. 1. SKULL.—(CABINET OF THE LYCEUM.)

Mustela canadensis. LIN. GMEL. Vol. 1, p. 95.
The Fisher. PENN. Arct. Zool. Vol. 1, p. 82.
M. pennanti. ERXLEBEN, System, p. 470.
M. canadensis. HARLAN, Faun. Am. p. 65.
Pennant's Marten. GODMAN, Am. Nat. Hist. Vol. 1, p. 203.
Pekan or *Fisher.* RICHARDSON, F. B. A. Vol. 1, p. 52.
Pekan or *Fisher Weasel.* EMMONS, Mass. Report, 1838, p. 24; of 1840, p. 38.
Black Cat of the New-York hunters.

Characteristics. Greyish over the head and anterior parts of the body; dark brown or black behind. Tail bushy. The largest of the genus.

Description. Form of the body typical. Head broad; nose acute. Ears about three inches from the nose, broad, rounded and distant. Canines long, more particularly those of the upper jaw; penultimate molar with a process on its inner anterior margin. Fore feet shorter than hind feet, robust, and covered with long hair. Soles of the feet thickly covered with short hair. Toes connected partially by a short hairy web; the nails sharp, strong, and incurved. Tail moderately long, bushy and acuminated at the tip, the hairs reaching two and a half to three inches beyond the vertebræ. Fur long, fine and lustrous, increasing in length on the posterior parts of the animal; it consists of two kinds, a short brown down, and longer and more rigid hairs; longer and blacker in winter than in summer.

Color. The markings are somewhat irregular; and there is a variety which, with the exception of the nose and feet, is entirely white. The general and more usual distribution of the colors is noted in the specific phrase. The long rigid hairs are brown at the base, and greyish towards the tips. This greyish color predominates so much on the head, neck, shoulders, upper and anterior portions of the body, as to give to those parts a hoary appearance. Towards the posterior part of the body, and including the tail, the color deepens into a dark brown or jet black. Throat, legs and belly blackish brown, with occasionally a small white spot on its throat, and a trace of another on the belly, sometimes unspotted beneath. Chin and nose brown. Ears margined with yellowish white. It is said to be lighter in winter than in summer. Length of head and body, 24·0; of tail (vertebræ), 11·0.

The Fisher or Black Cat of our hunters, is a large and powerful animal, standing nearly a foot from the ground. It was formerly very abundant in this State, but is now confined to

thinly settled northern districts. Twenty years ago, they were numerous in the western part of the State, where they are now scarcely ever seen. It is a nocturnal species, and lives chiefly on the smaller quadrupeds, but also devours frogs, fish and serpents. It climbs trees with great ease, and takes up its abode in the trunk of a tree. It appears to prefer marshy wooded swamps, and the vicinity of lakes and water courses.

The name of *Fisher*, which has been censured as not applicable to this animal, is, however, that by which it is best known, and which it has received from its characteristic habits. Richardson states that it feeds on the hoards of frozen fish stored up by the residents. We are informed by a person who resided many years near Lake Oneida, where the Fisher was then common, that the name was derived from its singular fondness for the fish used to bait traps. The hunters were in the practice of soaking their fish over night, and it was frequently carried off by the fisher, whose well known tracks were seen in the vicinity. In Hamilton county it is still numerous and troublesome. The hunters there have assured me that they have known a fisher to destroy twelve out of thirteen traps in a line of not more than fourteen miles in length. It brings forth two young annually. The hunting season for the fisher in the northern part of the State, commences about the tenth of October, and lasts to the middle of May, when the furs are not so valuable. The ordinary price is $1·50 per skin; but it is not so fine, nor so highly valued as that of the sable. Its geographical range is included between the fortieth and seventieth parallels of latitude, extending across the continent.

THE AMERICAN SABLE.

MUSTELA MARTES.

PLATE XI. FIG. 2.—PLATE XIX. FIG. 2. SKULL.—(CABINET OF THE LYCEUM.)

Mustela martes. LIN. GMEL. Vol. 1, p. 95.
Pine Marten. PENN. Arct. Zool. Vol. 1, p. 76. HARLAN, Fauna, p. 67. GODMAN, Vol. 1, p. 200, figure. RICHARDSON, F. B. A. Vol. 1, p. 51, (summer dress.)
M. zibbellina? GODMAN, Vol. 1, p. 208.
M. huro. FRED. CUVIER.
Pine Marten. EMMONS, Mass. Report, 1838, p. 25.
The Sable of the New-York hunters.

Characteristics. Varying in color from tawny to brown or black. Head constantly lighter. Length 20 – 30 inches.

Description. Head long and pointed. Stands rather high on its feet. Ears broad, short, and somewhat acuminated. Eyes small and black. Tail bushy, and enlarged towards the end. Toes with long, slender and compressed nails, nearly concealed by the hair.

Color, various, according to age, season and latitude. The following notes are derived from four specimens in the Cabinet of the Lyceum:

No. 1 is larger and higher colored than the others, measuring thirty inches in its total length. Head, sides of the neck and upper part of the throat white. Chin with a slight

tinge of brown. Ears margined with white. Reddish brown behind the ears. The inside of the legs, inferior and posterior parts of the feet, and the palms, dark brown. Tail ten and a half inches long, the tip of the hairs extending four inches beyond the vertebræ; dark brown at the tip, intermixed with a few white hairs; remainder of the body and tail yellowish white, becoming deeper on the posterior parts of the body. Throughout pale yellow. Claws white. The plate represents this specimen.

No. 2 is smaller, being only twenty-two inches in length. Head, chin and ears entirely white. Feet at the base with an obsolete circle of dusky brown. A dusky indistinct line along the dorsal ridge. Tail dusky for two-thirds of its length from the tip. General color bright orange, more vivid on the flanks and abdomen. Palms light-colored.

No. 3 and 4 resemble each other in the distribution of their colors, but are smaller than the preceding. Head greyish white; brownish behind the ears. General color fulvous, intermixed on the back and abdomen with brown, giving a dark hue to the animal. Legs, feet and tail blackish brown, the latter increasing in intensity towards its tip.

The Sable is a very pretty and active little animal, inhabiting the elevated and wooded districts in the northern parts of the State. It lives entirely in trees, and brings forth six to eight at a litter. It is a nocturnal animal, and excessively carnivorous; feeding on mice, birds' eggs, squirrels, etc. The females are said to be smaller than the males. It has been tamed; but from its petulant character, is never docile. The fur is exceedingly beautiful, and highly esteemed. The hunters assure me, that as you proceed north, the fur becomes darker and more valuable, but this seems rather a peculiarity in certain districts. Those obtained in our State, are more usually of the color noted in the figure, and sell for about $1·25 apiece.

The Sable is exceedingly active, and destroys great quantities of squirrels, the red squirrel only occasionally escaping by its superior agility. It is so prolific, and finds the means of living with so much ease, that it would long since have multiplied to a great extent, were it not hunted so perseveringly for its fur. The hunting season for the sable in this State begins about the tenth of October, and ends in the middle of April. The hunters assert, that in the beech-nut season, when they are very abundant, the sable will not touch bait of any kind, believing that at that time it feeds upon these nuts. It is probable, however, that the abundance of nuts attracts great numbers of the smaller quadrupeds, who are thus offered an easy prey to the sable.

A line of traps for these animals, technically called "a sable line," sometimes extends sixty or seventy miles, containing six to ten traps in a mile, according to the nature of the ground. The construction of these traps is exceedingly simple. The hunter cuts off long chips from the nearest tree, and drives them into the ground, forming three sides of a square about six inches across; the top is covered with spruce boughs. The bait, which is either a bit of venison, mice, red squirrel, or any other small animal, is put on the end of a round stick and placed within the trap, resting on a round stick lying on the ground across the open end; on this rests a short upright stick, supporting a heavy log or small tree. Any disturbance of the bait causes the log to fall and crush the animal. These traps are visited once a

fortnight, and oftener if practicable. The fisher and wolvrene, as we have before remarked, will often destroy these traps, by breaking into them behind, and eat up not only the bait, but the captured animal.

I am inclined to believe that the American Sable is very distinct from the Pine Marten of Europe, with which it is usually arranged; but as I have had no means of making a direct comparison, I shall adhere to the ancient name. Its geographical range extends from the Atlantic to the Pacific, and it is found in all the dry wooded districts between the fortieth and sixty-eighth parallels of north latitude.

THE SMALL WEASEL

MUSTELA PUSILLA.

PLATE XIV. FIG. 1.—(ALBANY MUSEUM.)

Mustela (Putorius) vulgaris. RICHARDSON, (excl. syn.) Fauna Bor. Am. Vol. 1, p. 45.
P. vulgaris. EMMONS, Mass. Report, 1840, p. 44.

Characteristics. Color same as that of *P. noveboracensis* in its summer coat, but smaller; unchanging. Tail one-fourth of the whole length. Length 12–13 inches.

Description. Body vermiform; head somewhat obtusely pointed. Ears broad, wide, and slightly pointed above. Eyes black and prominent. A series of dark brownish whiskers along the upper lips, and another, consisting of five or six, parallel with it above; a small patch of two or three above the eye. Fore feet short, and rather robust; claws acute, curved, and almost entirely concealed by the long hairs. Tail short, cylindrical, even throughout, not bushy; the tips of hairs extending beyond the vertebræ. Teeth of the typical number; above, the two outer incisors largest, the intermediate ones equal; beneath, they are crowded, with the two external largest, the two intermediate small, and the remaining two behind and somewhat between the external and medial incisors. In the upper jaw, the second jaw tooth is small and distant, the posterior with a large spur directed inwards.

Color. Uniform throughout the year; more glossy, but paler than in the New-York weasel. Upper part of the head, neck and body, of a light reddish brown; the same color prevails on the outer and anterior part of the fore legs, the whole of the head, legs, rump and tail. The chin, a small spot above the angle of the jaw extending to the borders of the upper lip, throat, belly and breast, white. On the throat this color extends to the sides of the neck, appears on the posterior parts of the fore legs, becomes dilated on the anterior part of the abdomen, then irregularly contracted, and subsequently throwing off an acute-angled patch of the same color on the upper and external part of the thighs. Tail a shade darker at the tip.

Total length,	10·8.	Tail (vertebræ),	1·8.
Head and neck,	2·8.	Ditto, including fur,	2·1.
Body,	6·0.		

We suppose this to be the Common Weasel of Richardson, which he states to be identical with the Common Weasel of Europe. It is, however, generically different, and we have been consequently compelled to suggest a distinctive name. Godman, Vol. 1, p. 193, asserts, on the authority of Charles Bonaparte, that the Ermine, in its summer coat, has been usually considered by naturalists as the *M. vulgaris* of Europe. This is a mistake: it is the present species which has thus been confounded.

It is by no means a rare animal, but is difficult to capture, and is usually known under the name of the *Little Weasel*. It feeds on mice, insects, young birds, eggs, etc., and possesses all the voracity characteristic of the tribe.

THE BROWN WEASEL.

MUSTELA FUSCA.

Mustela fusca. BACHMAN, Proceed. Ac. Sc. 1841, p. 94.

Characteristics. Brown above; pure white beneath. Tail one-fifth of the whole length. Feet with long hairs. Length, 12·0.

Description. Form as in the preceding, but more robust. Feet remarkably robust, and densely covered with long hairs, which almost conceal the nails. Ears broad and rounded. Tail with no enlarged tuft at the end.

Color. Dark fawn above, becoming deeper on the posterior part of the back; the tip of the tail still darker. Beneath, pure white, from the chin extending around the mouth, throat, belly, and interior of the extremities.

Head and body,	9·1.
Tail (vertebræ),	2·8.
Tail, including hairs,	3·2.

In the State Collection is a specimen of this animal, upon which I made, in 1840, two years since, the following note: "Taken in May, in Suffolk county; differs from *pusilla* in its legs, "which are very robust, and covered with long hair. It resembles *noveboracensis* in its "markings; allied to *vulgaris* of Richardson, (excl. syn.), but his species has slender feet. "We wait for more extended opportunities of comparison, before considering it a new "species."

Recently, Bachman, (Op. cit.) has given this a careful examination, and distinguished it as a new species. We adopt his name.

(*EXTRA-LIMITAL.*)

M. frenata, Lichtenstein. (BACHM. Proc. Ac. Sc.) Light fawn above, yellowish beneath; ears and nose dark brown; a white spot on the head, and a band above the eyes. Whole length 18 inches; tail 6·5. *California.*

GENUS PUTORIUS. *Cuvier.*

Form and habits of the preceding. Head sub-globose. Muzzle short and blunt. Body highly vermiform. Neck very long. Tail long, cylindrical, not bushy. Cheek teeth $\frac{8}{10}$. *All with a musky odor. Nocturnal.*

THE NEW-YORK ERMINE.

PUTORIUS NOVEBORACENSIS.

PLATE XII. FIG. 2, WINTER DRESS. — PLATE XIV. FIG. 2, SUMMER DRESS. — (STATE COLLECTION.)

Stoat Weasel. PENN. Arct. Zool. Vol. 1, p. 75.
Mustela erminea. HARLAN, Fauna Am. p. 62.
The Ermine Weasel. GODMAN, Am. Nat. Hist. Vol. 1, p. 193, fig. 1, winter dress. ID. ib. Vol. 1, p. 693, pl. fig. 2, summer dress.
Putorius noveboracensis. Report N. Y. Survey, 1840, p. 18. EMMONS, Mass. Report, 1840, p. 45.

Characteristics. Summer, reddish brown above, yellowish beneath; winter, white. Tip of the tail black. Length 16 – 24 inches.

Description. Neck and body long and slender. Forehead convex. Whiskers numerous, a few extending as far as the ears. Eyes small, black and lively, 0·7 distant from the nose. Ears low, broad and rounded, 0·5 high, not entirely surrounding the auditory canal, which is covered with long hair; on the margin, the hairs are sparse and short. Legs short, robust, five-toed, the inner much the shortest. In winter, the sharp curved claws and the soles covered with hair. Six abdominal and ventral teats. Fur short and soft, somewhat coarser and longer on the hairy tail, which is bushy at the end. Teeth thirty-four, as in *P. vison.*

Color. In summer the head, neck and body chesnut brown above, darker behind, and increasing in intensity along the tail to the tip. This brown color extends along the flanks, and the external parts of the extremities. Chin whitish, passing into yellowish white. A whitish stripe commencing at the chin, expanding a little on the throat towards the ears, broader over the breast, covering the interior and upper part of the fore legs, preserves nearly the same breadth along the belly, and terminates on the upper and inner part of the thighs. This color is separated along its course from the brown above by a well defined irregular line, which is occasionally dark brown. This is the ordinary state of the fur during summer, which it often retains late in autumn, and, as I have reason to believe, often through the winter. My friend Mr. Linsley has a specimen, which is "entirely rufous black, with two white spots "under the throat; lower jaw white from the point to the rictus." In its complete winter coat, it is pure white along the back, light sulphur yellow along the sides and beneath, including the legs. Tail jet black at the tip.

Length of head,	2·0.	Tail (vertebræ),	4·0.
Length of neck,	2·0.	Ditto, including fur,	5·1.
Length of body,	6·5.		

These are, however, not the largest dimensions. I have seen one from Dutchess county, and another from Rockland county, measuring sixteen and a half inches; and my friend Mr. Linsley states, that he has one measuring twenty and a half inches.

The habits of this animal, as the ruthless destroyer of poultry, are well known; but these injuries, which are obvious and potent, are, we think, more than counterbalanced by their destruction of hordes of mice which congregate in barns and in stacks of grain exposed in the fields. Upon one occasion, we remember to have seen an example of fifty or sixty mice, whose lacerated remains bore testimony to the valuable services of this species.

I have never seen the true Ermine in its summer dress, and only know it from Pennant's description (Arct. Zool. Vol. 1, p. 75): "Ears edged with white; head, back, side and legs, "pale tawny brown; under side of body white; lower part of tail brown, end black."

Our animal is exceedingly active, nocturnal in its habits, and hiding under piles of wood or stone. We do not know whether it makes a burrow. Its geographical limits as yet are not settled. We suppose it to be a northern animal, found as far south as Pennsylvania. In its white coat, it is called, in some parts of the State, the *Catamingo*, and the *White Weasel*.

THE MINK.

PUTORIUS VISON.

PLATE XI. FIG. 1.—PLATE VIII. FIG. 3, A, B. SKULL.—(STATE COLLECTION.)

Mustela vison. LIN. GMEL. Vol. 1, p. 94.
Minx Otter. PENN. Arct. Zool. Vol. 1, p. 87.
Vison. ID. ib. p. 78.
M. vison. HARLAN, Fauna Am. p. 65.
M. lutreola. GODMAN, Am. Nat. Hist. Vol. 1, p. 206.
M. (Putorius) vison. RICHARDSON, F. B. A. Vol. 1, p. 48.

Characteristics. Tawny. Chin white or yellowish white. Ears short, and mostly concealed in the fur. Tail half as long as head and body. Length 20·0 – 25·0.

Description. Body long and slender. Head small and rounded. Ears broad and low, with the auricular opening very large; they are nearly hidden by the fur. Eyes small. Whiskers stiff, shorter than the head. Muzzle thick, and somewhat depressed. Neck very long. Legs short in proportion to the bulk of the animal. Claws short, slightly curved, blackish at the base, horn-colored at the tips, and nearly concealed by long subrigid hairs. Toes webbed, with short hairs on the webs above and below. Tail thick at the base, cylindrical, slender, gradually tapering to the tip. The fur shortest on the head, longer behind, and is of two kinds; a soft light grey down, covered by longer lustrous hairs. Two fetid glands near the

insertion of the tail. Six teats, ventral. Teeth 34. Above, the four intermediate incisors are alike, and subequal; the exterior larger, channelled on the outside, and somewhat enlarged at the base. Upper canines larger and longer than those below, and in their reciprocal position exterior to, and reaching below the sockets of the lower canines, with no tubercle to their bases. First cheek tooth above smallest, with a sharp point, and a broad shoulder directed outwards, with two fangs; the second larger, with a single point, and two equal shoulders; the third largest, with three points in a line, the middle largest and the anterior smallest, with a fourth on an internal space: this tooth is emarginate in front, almost receiving the posterior shoulder of the preceding tooth. The last cheek tooth wider than long, with two elevations externally circumscribed by a raised margin; its internal projection has one blunt point, likewise surrounded by a raised margin. In the lower jaw, the incisors are smaller than those above, the two medial smallest and subequal; the first cheek tooth very small, elevated in front, with a slight ridge dividing the shoulder behind; the next larger, with its posterior shoulder lower than that in front; the succeeding one tricuspid, triangular, with its shoulders equal; penultimate tooth largest, tricuspid, its posterior point truncate with a sharp ridge; the last smallest, with a central depression, and a raised margin which is highest on the outside.

Color. Nearly uniform, reddish brown or tawny above, slightly paler beneath. Chin, and frequently a small spot on the throat, and occasionally one or two smaller spots between the fore legs, white. Posterior portion of the tail blackish, frequently intensely black at the tip.

Head and body,	14·0.	Height at meatus,	0·9.
Tail (vertebræ),	7·0.	Greatest diameter behind meatus,	1·1.
Ditto (tips of fur),	8·0.	Extent over zygomatic arches,	1·3.
Length of skull,	2·3.	Skull in the same line,	0·5.

The Mink is a well known animal in every part of the State. Its popular name is corrupted from *mænk*, given to it by our early Swedish colonists. It lives almost exclusively near ponds and water courses, feeding on fish, fresh-water shells, aquatic reptiles, and the eggs of tortoises. In their habits they are closely allied to the Otter; so much so, that Pennant arranged it under that genus, and in his History of Quadrupeds calls it the Lesser Otter. It swims and dives with great facility, and can remain a long time under water. It has a strong disagreeable odor, which, according to Prof. Emmons, is that of the skunk and cat combined. Occasionally it invades the poultry yard, and causes great havoc. It feeds also upon field mice, and other small quadrupeds. It is said to be capable of domestication. The hunters in the north of the State have described to me two varieties of the Mink: One they call *Mountain Mink*, which is small and black; the other, which they call the *Water Mink*, is much larger, and of a chesnut red. From their dissimilar habits, I should be inclined to suspect the first to be a distinct and hitherto undescribed species.

FAMILY V. LUTRIDÆ.

Embraces the Otters, which are amphibious, with broad palmate feet. Tail enlarged at the base, and more or less horizontally flattened. Piscivorous; valuable for their fur. Comprises two genera.

GENUS LUTRA. *Ray, Cuvier.*

Head broad and rounded, terminating in a blunt muzzle. Ears very short. Body robust. Legs short. Toes five before, and the rudiment of a fifth behind, connected by a membrane, and armed with short not retractile claws. A fetid gland on each side of the vent, containing fetid matter. Good swimmers; live along banks of streams. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *cheek teeth,* $\frac{1}{1}\frac{0}{0} = 36$.

Obs. In the latest systems, nine species are enumerated, of which three are from America. The existence of more than one species in America is, however, as yet not clearly established.

THE NORTH AMERICAN OTTER.

LUTRA CANADENSIS.

PLATE III. FIG. 1.—PLATE XXXIII. FIG. 1, 2, 3. VIEWS OF THE SKULL.

Common Otter. PENNANT, Arct. Zool. Vol. 1, p. 86.
Land Otter. WARDEN, Hist. U. S. Vol. 1, p. 206.
Lutra canadensis. SABINE, Franklin's Jour. p. 653.
L. braziliensis. HARLAN, Faun. p. 72. GODMAN, Vol. 1, p. 57, pl. fig. 2.
L. canadensis. RICHARDSON, F. B. A. Vol. 1, p. 57. (Large Northern Var.)
Canadian Otter. GRIFFITH, Cuv. R. An. Vol. 2, p. 316, figure.
American Otter. EMMONS, Mass. Report, 1838, p. 25; 1840, p. 46.

Characteristics. Glossy brown. Chin and throat dusky white. Tail shorter than the body. Length three and a half to five feet.

Description. Head globular, but not as much as in the European species. Lips thick and fleshy. Ears short and rounded. Eyes small for the size of the animal, and near together. Whiskers remarkably rigid. Body long, cylindrical. Tail slightly depressed at the base, nearly one-fourth of the total length; at the base of the tail, two oval glands. Fur fine and dense, intermixed with coarser hairs. In their dentition, the Otters are eminently characterized by the enormous dilatation of the two posterior cheek teeth in the upper jaw. Our species, in this particular, offers some variations from the European Otter. The penultimate jaw tooth, in one species, has a broad internal heel directed obliquely forward, with a deep fissure dividing the surface into two rounded and elevated portions; and the pointed tubercle is broad, with a high shoulder posteriorly, and comparatively little elevated. The last tubercular tooth

subquadrate, nearly as large as the preceding, and its greatest axis directed obliquely backwards, with four or rather six distinct elevated points; but the outer raised margin, which is so conspicuous in the European Otter, appears to be indistinct, or simply elevated into two pointed tubercles, or wanting entirely, in the American. With age the anterior jaw teeth become effaced. In a very aged specimen which we have placed in the State Collection, the two anterior jaw teeth on each side (false molars) have disappeared, and even the canines are worn down to the sockets. Length of this skull, 4·1; height at meatus, 1·7; transverse diameter at meatus, 2·2; distance across the zygomatic arches, 2·9; narrowest diameter, 0·8.

Color. This varies with the season to a slight extent, but is usually of a dark glossy brown, and white or light-colored about the face and throat. In summer, nearly black, lighter beneath. Tail darkest towards the tip.

Head and body, ...	39·0 – 48·0.
Tail, ...	14·0 – 18·0.

The females are smaller than the males.

The American Otter, once so numerous in every part of the State, is now exceedingly scarce. In the counties of Kings, Queens, Suffolk and Richmond, it is now extirpated. In the northern districts, it is yet sufficiently numerous to become an object of pursuit. The hunting season for the otter commences there about the twentieth of September, and continues until the middle of May, and its fur ranks in value next to that of the beaver: a good skin is worth eight dollars. They are used by hatters for the finer sort of hats, and are also converted into costly caps.

The Otter is a sagacious, wary animal, selecting low swampy grounds near a pond or running stream for its abode. He makes an excavation in the bank, which opens under water, and a small breathing hole to the surface of the ground. Like the Beaver, he is too sagacious to be caught by any bait in a trap; and accordingly, the steel trap is placed in the water beneath the exit from their burrow, or at the bottom of one of their *slides*. These *otter slides*, as they are termed, form one of the most interesting peculiarities in the history of the animal, and almost approach the fabulous. In winter, they select a high bank of snow, and amuse themselves for hours in sliding down, head foremost. In summer, they choose a steep bank by the side of a stream, which terminates in deep water, and indulge there in the same recreation. I have never seen the animal thus employed, but it is universally believed among hunters; and I saw, in the uninhabited northern districts of the State, many of the places which had been used as slides, and which pointed out to the keen eye of the hunter a sure sign of numerous otters in the vicinity.

The Otter is capable of being domesticated, and lives principally on fish and other aquatic animals. They live in small families, like the Beaver. They have two young at a litter, about the middle or latter end of March, but the period of gestation is unknown. The secretion from their anal glands is used as a bait.

The Canadian Otter, as described by Richardson, appears to be a large variety, with a uniformly colored fur above and beneath. The figure given by Griffith represents it with a white nose, chin and abdomen. I have carefully compared the skull of the southern species *lataxina*, with the New-York Otter, and can find no essential nor even trivial difference. If, then, as I apprehend, the species described by Richardson, and the *lataxina*, are identical with the one above described, this Otter is found from the Atlantic to the Pacific, and from the Gulf of Mexico to the shores of the Arctic sea.

(*EXTRA-LIMITAL.*)

L. lataxina. (Fred. Cuv. Dic. Sc. Nat. Vol. 27, p. 243.) Deep blackish brown, paler beneath; the long coarse hair uniform brown black; the fine down brownish above, greyish on sides of the head and under side of neck. *Carolina, Kentucky.*

Genus Enhydra, *Fleming.* Embraces the Sea Otter, and characterized by having six incisors above, and but four beneath. Cheek teeth, $\frac{12}{16} = 38$. Body very long; legs and tail very short.

E. lutris. Sea Otter. (Griff. Cuv. Vol. 2, p. 316, fig.) Chesnut brown or black; twice the size of the common otter; fur exceedingly fine. Total length five feet; tail ten inches. *North Pacific Coast.*

FAMILY VI. CANIDÆ.

Muzzle elongated, naked, glandular. Ears moderately large, and in most of the domesticated species pendent. Tongue smooth and soft. Tail for the most part bushy. Fore feet with five, and hind feet with four not retractile claws. Cheek teeth twelve above, and fourteen below.

Obs. In this family, we propose to include the Dog, Fox and Wolf, which are extremely difficult to separate by positive characters. The former is known only in a domesticated state.

GENUS CANIS.

Tail recurved. Pupil of the eye circular. Vary indefinitely in form, size and color, the result of domestication.

THE DOMESTIC DOG.

Canis familiaris.

Upwards of thirty varieties or races have been enumerated by systematic writers, nearly all of which have been introduced into this country. Of those peculiar to North America, we find,

Var. a, *borealis.* (Esquimaux Dog.) Fur long, thick and woolly beneath; top of the head and back black; nose, cheeks, belly and legs white; ears short, erect.

VAR. b, *lagopus.* White, with patches of blackish grey; ears pointed, erect; foot broad and hairy; tail bushy.

VAR. c, *terræ-novæ.* (Newfoundland Dog.) Head broad; nose blunt; ears long, soft and pendulous. Of this there appears to be two distinct races: One has the breast, posterior part of the thighs and tail with long waved hair, the rest of the body with smooth and compressed hair; the other variety is entirely covered with long waved silken hair.

VAR. d, *canadensis.* Black and grey, mixed with white; ears erect, long, shaggy.

VAR. e, *novæ-caledoniæ.* Spotted; body long; legs short, straight; ears erect.

The most conspicuous among the imported varieties are, the *danicus*, or Spotted Carriage Dog; *graius*, or Greyhound, of which there are several races; *extrarius*, or Spaniel; *aquaticus*, or Curly Poodle; *avicularius*, or Pointer; *molossus*, or Bulldog; *sagax*, or Hound, &c. In this State, our hunting dogs are almost exclusively derived from England. The breed used for deer is the Fox-hound, and frequently a mixed breed between the Harrier and Stag-hound.

GENUS LUPUS.

Eyes oblique. Tail straight. Pupil of the eye circular.

THE COMMON AMERICAN WOLF.

LUPUS OCCIDENTALIS.

PLATE XXVII. FIG. 2.

Canis lupus. HARLAN, Fauna, p. 81.
The Common Wolf. GODMAN, Am. Nat. Hist. Vol. 1, p. 255, fig. 1.
C. (Lupus) occidentalis. RICHARDSON, F. B. A. Vol. 1, p. 60.
C. lupus. EMMONS, Mass. Report, 1838, p. 26; 1840, p. 28.

Characteristics. Color various from white to black, usually greyish. Space between the ears greater than their height. Feet broad. Neck and tail with bushy hair.

Description. Compared with the European species, the body is more robust, and the legs shorter; the muzzle thicker and more obtuse. Ears erect and conical.

Color. In this State, the prevailing color is dark grey, mixed with reddish; darker along the back; shorter in summer. Frequently whitish about the ears, throat and breast. Exterior of the ears and legs with a reddish tinge. Anterior part of fore legs blackish. Tail varied with white, black and ferruginous.

Length of head and body, ...	36·0 – 48·0.
Tail, ...	10·0 – 12·0.

Prof. Emmons gives the total length from a specimen in his possession, 60·3.

The American Wolf, hitherto confounded by our systematic writers with the European, offers many varieties, which, as in dogs, seem to affect particular localities. In this State we have two varieties.

Var. a. *Grey Wolf.* White or greyish white in winter; in summer it has short reddish hairs. This is the most common kind.

Var. b. *Black Wolf.* Entirely black, more bulky and powerful than the preceding. Very rare.

The Wolf, in this State, confines its depredations chiefly to deer and other animals. In some of the southern counties, where they were formerly so numerous as to require legislative enactments, they are now entirely extirpated. Vanderdonck, writing from New-York about the year 1645, says, that one of the principal objections to keeping sheep in the Colony, was the number of wolves. They are still found in the mountainous and wooded parts of the State, and, we believe, are most numerous in St. Lawrence and the adjacent counties. We have been assured by intelligent hunters, that their ravages among deer are so great that they destroy five to one killed by man. They follow deer either singly, or in packs of eight or ten, with all the ardor of a pack of hounds, and with a prolonged howl. They usually select a young or injured deer, and trust more to tire him down, than to overtake him by superior speed. In the summer, their prey easily escapes by taking to the water; but in winter, the same instinct leads to his immediate capture, for on the ice the wolf quickly overtakes him. Towards spring, there is scarcely a lake in the north of the State that has not numerous carcases of deer on its frozen surface. In most of the counties, bounties varying from ten to twenty dollars per head are offered for the wolf, paid partly by the State, and partly by the county and the township.

Our wolf is equally voracious and cowardly, flying before man. I have, however, known them, when satiating their hunger over the carcase of a deer, to snarl and snap at the approach of a man, and only to leave their prey reluctantly when he arrived almost within striking distance.

(*EXTRA-LIMITAL.*)

Var. a. *Dusky Wolf.* (Say, Long's Exped. Vol. 1, p. 333. Richardson, pl. 3.) *Northern and Western Regions.*

Var. b. *Pied Wolf.* (Richardson, Vol. 1, p. 68.) *Arctic Regions.*

Var. c. *White Wolf.* (Lewis and Clark, Vol. 1, p. 107.) *Arctic and Western Regions.*

Var. d. *Florida Wolf.* (Bartram, p. 199.)

Var. e. *Yellow Wolf.* (Lewis & Clark, Vol. 1, p. 40.) *Missouri.*

Var. f. *Prairie Wolf.* (Say, Long's Exped. Vol. 1, p. 27 and 162.) *Missouri.*

GENUS VULPES.

Nose pointed. Head more triangular than in the preceding. Pupils linear. Eyes oblique. Upper incisors nearly vertical. Tail long, bushy and cylindrical, without pendulous hairs. Have a fetid odor, and burrow in the earth. Nocturnal. Smaller and more numerous than the preceding.

THE RED FOX.

VULPES FULVUS.

PLATE VII. FIG. 1.—(STATE COLLECTION.)

Red Fox. LEWIS & CLARK, Vol. 2, p. 159.
Canis fulvus. DESM. Mammalogie, p. 203.
Red Fox. SABINE, App. Frankl. Journey, p. 656.
C. vulpes? and *C. fulvus.* HARLAN, Fauna, p. 86 and 89.
The Red Fox. GODMAN, Am. Nat. Hist. Vol. 1, p. 276.
American Fox. RICHARDSON, F. B. A. Vol. 1, p. 91, pl. 6.
Canis (*Vulpes vulgaris*) *vulpes? The Fox.* ID. ib. p. 97.
Cross Fox. ID. ib. p. 93, (Variety.)
The Red Fox. EMMONS, Mass. Report, 1840, p. 30.

Characteristics. Reddish above, whitish beneath. Ears behind, and anterior part of legs varying from light brown to deep black. Length 3 – 4 feet.

VAR. a, *decussatus*, with black stripes across the neck and shoulders.

VAR. b, *argentatus*, black entirely.

Description, (from a large male killed in Queens county, January.) Snout small and pointed. Length of head, 7·0.

Color. Anterior part of the head, the flanks and back, bright reddish, more particularly along the back and foreshoulders, where the color is more intense. Margin of the upper jaw and chin, pure white. Throat, breast, and a narrow space along the belly, whitish, mixed with brown on the latter. Fore and hind feet black in front, the black on the latter extending up on the outside of the thigh. Toes margined with fulvous. Brush ample, reddish, composed of two sorts of hairs; the one, black at the base and reddish at the tips; the other, much longer, entirely black, and giving to the whole tail a dusky appearance.

Head and body,	29·0.
Tail (vertebræ),	12·0.
Ditto, tips of hairs,	16·0.

The Red Fox varies considerably in weight and size; the specimen above described weighed eleven pounds, and I have heard of others weighing fifteen pounds, but such are not common: the more usual weight is from eight to ten pounds. Although this fox burrows well, yet it is not uncommon to find them taking possession of the burrows of the skunk, for the purpose

of rearing their young. Richardson states that it burrows in summer, and in winter takes refuge under a fallen tree. It brings forth four to six young, about the latter end of March or first of April, in my neighborhood: these are at first covered with a smoke-brown fur. In a litter which I once saw, the tips of the tail in all were white, and like the dog, were blind for some days after birth. They feed on the smaller quadrupeds and birds, and are accused of destroying lambs. They make occasional forays upon the barnyard, but in this respect they are not so daring as the other species, and perhaps in some measure compensate for these injuries by destroying field mice and other noxious vermin. Its flesh is rank and disagreeable. It is to this species we refer two strongly marked varieties, which have by some naturalists been treated as species.

1. *The Cross Fox.* Color of the preceding, with a dark stripe on the neck from the head to the back, crossed at right angles by another dark stripe over the shoulders. This cross is sometimes only feebly distinct, and at others well defined. It has the size, form, habits and fine fur of the Red Fox, and is always considered by the hunters as a variety. The caprice of fashion has attached a great value to this skin. While the red fox skin is valued at about two dollars, the cross fox has been known to sell for twelve, and sometimes as high as fifteen dollars. It occurs in every part of the State, but more particularly in the northern districts.

2. *The Black Fox.* (Godman, Vol. 1, p. 274, pl. fig. 1.) Almost entirely black; the end of the tail and spots on the breast occasionally white, sometimes intensely hoary. This is very rare in this State. I have never met with it; but I have been assured by hunters, in the northern counties, that they have sometimes killed it. Richardson, p. 94, asserts that its fur fetches six times the price of any other fur produced in North America. Its value doubtless increases with the intensity and purity of the black color.

THE GREY FOX.

Vulpes virginianus.

PLATE VII. FIG. 2.—(STATE COLLECTION.)

The Grey Fox. Catesby, Car. Vol. 2, p. 78.
Canis virginianus. Gmelin, Syst. Vol. 1, p. 74.
C. cinereo-argentatus. Say, Long's Exped. Vol. 2, p. 340.
C. virginianus. Harlan, Fauna Americana, p. 89.
The Grey Fox. Godman, Am. Nat. Hist. Vol. 1, p. 280 (figure). Emmons, Mass. Report, 1840, p. 31.

Characteristics. Grey, varied with fulvous; a patch of black on each side, between the eye and nose. Smaller than the preceding.

Description. The body is lower on its legs, and its muzzle is more acute than in the Red Fox. Tail thick and bushy.

Color, generally hoary or silvery grey, becoming darker from the foreshoulders to the posterior parts. Fur at base lead color, then soiled white, gradually becoming white, and tipped with black. Head grey. Ears yellowish within, tinged with reddish around their bases; tips dark brown, yellowish behind. On each side of the head a sub-triangular patch

between the eyes and nose; near the orbits, this black patch is produced upwards in a narrow line towards the ears. Muzzle black, yellowish on each side for a small space above; sides of the neck tawny; lower jaw black. Breast occasionally spotted with white. Beneath, light colored. Tail of the general hue of the body, slightly tinged with rufous beneath, and occasionally darker at the tip.

Head and body,	18·0 – 25·0.
Tail (vertebræ),	7·0 – 10·0.
Ditto (tip of hairs),	9·0 – 12·0.

This species is more common in the southern counties than farther north. On Long Island it is very abundant, and is there frequently known under the name of the *Plain* or *Grass Fox*. It affords great amusement to hunters, but not for the reasons assigned by Godman; namely, that it is killed generally near the place where it is first started: On the contrary, it usually takes a direct course for many miles, at least on the great plains; and as the ordinary deer-hound is generally employed, I have often known it to escape.

The Grey Fox is bolder and more astute, if possible, than the red one, and more frequently prowls about barn-yards. Very little, however, is known of his habits, beyond his destructive propensities. Catesby asserts that they climb trees with facility. This is probable, for I have witnessed the same fact in the Red Fox, when closely pursued by hounds. The Grey Fox does not extend far beyond 42° north, and its southern limits extend to Florida.

(*EXTRA-LIMITAL.*)

C. velox. Burrowing Fox. (Say, Long's Exped. Vol. 1, p. 486.) Body slender; silvery grey, varied with fulvous. Tail long and blackish. Smallest of the American Foxes. *Missouri.*

FAMILY VII. FELIDÆ.

Head short in proportion to its length, rounded. Muzzle short, obtuse. Claws completely retractile. Exclusively carnivorous. Nocturnal.

Obs. This family, which corresponds nearly with the old linnean genus *Felis*, has been extended, by some modern system-mongers, to include Dogs, Wolves and Foxes. As we understand it, it comprises four or five genera, and about forty species. In this State, we have but three representatives of this family, included under two genera.

GENUS FELIS. *Linneus.*

Ears short and distant, not tufted. No mane. Tail long, varying occasionally in the same species. Tongue roughened with prickles. Claws curved and acute. Cheek teeth eight above, and six below.

Obs. The common imported Domestic Cat belongs to this genus. It is now generally believed to have been derived from the *F. maniculata*, Ruppel, which still exists in a wild state in the northern parts of Africa. Ruppel supposes it to have been first reclaimed by the Egyptians. It is a common opinion that we have, in this country, *wild cats*, which have been derived either from the *domestic cat* resuming its primitive wildness, or by alliance with those already in a wild state. This is a great error. We have no small species, characterized by a long tail, in the country.

THE NORTHERN PANTHER.

Felis concolor.

PLATE IX. FIG. 2. Adult. — PLATE IX. FIG. 1. Young.

Felis concolor. Lin., Gmel. Vol. 1, p. 79.
Cuguar. Loskiel, p. 82.
F. cougar. Temminck, Monog. de Mamm. p. 134.
F. concolor. Harlan, Fauna Am. p. 94.
The Cougar. Godman, Am. Nat. Hist. Vol. 1, p. 291, figure.
F. concolor. Desm. Mammalogie, p. 218.
The Puma, or *American Lion.* Emmons, Mass. Report, 1840, p. 35.

Characteristics. Very large. Uniform tawny, paler beneath. Length 7 – 10 feet. Young, spotted with brown.

Description. Body long, cylindrical, and rather slender. Legs robust, and comparatively short. Ears somewhat rounded. Tail long, slender, cylindrical. Fur soft and short.

Color. Body and legs of a uniform fulvous or tawny hue. I have never observed the spots of a deeper hue, seen only in certain lights, which Temminck ascribes to this species. Ears light-colored within, blackish behind. Belly pale reddish or reddish white. Face sometimes with a uniform lighter tint than the general hue of the body; oftener with the mouth, chin, and internal angle of the eyes white. "Tail of the male longer than the female, dark brown "at the extremity." (*Emmons.*)

Head and body,	53·0 – 84·0.
Tail,	20·0 – 27·0.

Description of a young Panther, not more than a week old, from the Collection of Prof. Emmons. Ears pendulous, furnished with hair within and without, projecting beyond the margins. The whole body covered with a soft dense fur, forming on the sides of the neck an indistinct collar. Claws sharp, curved, not channelled.

Color. The whole body light reddish grey, with oblong irregular blackish brown spots. According to Prof. Emmons, these spots mostly disappear at the first shedding of the hair. Tail with four annulations of the same color, blackish at the tip; beneath, light dusky brown. Outside of the legs irregularly banded with grey and brownish, the latter predominating on the fore legs. Space between the eyes, light brown. Ears black exteriorly, white within. Eyes large and black. A space on the middle portion of the upper lip, together with the whiskers, white. Infra-orbital space and the chin soiled grey.

Head and neck,	4·5.	Height of ears,	0·7.
Body,	8·0.	Ditto at foreshoulders,	4·8.
Tail,	4·8.	Girth round chest,	7·5.

In this specimen, only the four lower incisors were developed.

The difference in the length of the tail in this species is worthy of note; amounting, in individuals of nearly the same size, to several inches. In a specimen alluded to by Godman, the head and body was four feet five inches, and the tail two feet four inches. Prof. Emmons gives a total length to one individual, of nine feet four inches. In a female, the tail was one foot nine inches; and in a male, two feet three inches. Whether this is a constant sexual distinction, is not yet sufficiently determined. The largest individual of which we have any account, is in the Museum at Utica. It was discovered on a small island on Lake Fourth, Herkimer county, and killed by the hunter Wood, just after it had taken to the water. When recently killed, it had a total length of eleven feet three inches.

The *Cougar* or *Painter*, (a corruption of the word *Panther*,) is now rarely seen in the southern parts of the State; though the writer remembers, when a boy, the consternation occasioned by the appearance of one of these animals in Westchester county, not more than twenty-five miles from New-York. In the early settlement of this State, this animal was believed to be a lion; and we find in Vanderdonck's History of the New-Netherlands, the following passage in relation to this subject: "Although the New-Netherlands lie in a fierce "climate, and the country in winter seems rather cold, nevertheless lions are found there, "but not by the christians, who have traversed the land without seeing one. It is only known "to us by the skins of the females, which are sometimes brought in for sale by the natives. "In reply to our inquiries, they say that the lions are found far to the southwest, fifteen to "twenty days journey; that they live in very high mountains, and that the males are too "active and fierce to be taken."

In this State, the Panther is most numerous in the rocky northern districts, and particularly in the counties of Herkimer, Hamilton and St. Lawrence. They are occasionally seen among the Kaaterskill mountains; and the specimen in the New-York Museum, which has served as a basis for many marvellous legends, was obtained from this locality. It appears rarely by daylight, unless hard pressed for food, but usually conceals itself behind fallen trees or rocks until evening. It prefers for its usual retreat, ledges of rocks inaccessible to man, which are known familiarly to the hunters under the name of *panther ledges*. They wander,

however, over large tracts of country in search of their prey, but rarely leave the forests. When followed by dogs, it takes to the nearest tree, and looking down upon its assailants, makes a noise like the purr of a cat, but much louder. The screams attributed to this animal during the night, are supposed by many hunters to proceed from some species of owl. The female brings forth two at a litter. They prey upon deer, and all the smaller quadrupeds, not even refusing the Canada porcupine. Occasionally they take to the water, but swim deeply and badly.

The Panther is an animal of undoubted strength and ferocity; and under certain circumstances, such as are so graphically depicted by our celebrated novelist Cooper, may be induced to take a stand before the hunter. Notwithstanding the various stories of their ferocity and courage, I have never yet met with a well authenticated account of their having attacked a man. In this I am sustained by the testimony of every hunter I have conversed with; they represent them as uniformly cowardly, and retreating as quickly as possible from the face of man. Prof. Emmons states, that most of the tales relating to its depredations are fictitious; and that in the part of St. Lawrence county where they are most numerous, no instance is known of their having destroyed a single individual, man or child. I was told by a hunter, that upon one occasion, he met with a female panther and two of her cubs. They were quite helpless, and he took them up in his arms, the mother following at some distance, and stopping whenever he stopped, without venturing to attack him. In this way she followed him for two or three miles, when, as he approached a settlement, she finally disappeared. They have been known, however, to approach the *shanty* of the hunter, attracted no doubt by the fire or the smell of victuals; but the smallest movement on the part of the hunter would be the signal for their disappearance. I was told of one in Warren county, that resorted to a barn, from whence he was repeatedly dislodged, and finally killed. He showed no fight whatever. His mouth was found to be filled with the spines of the Canada porcupine, which was probably the cause of his diminished wariness and ferocity, and would in all probability have finally caused his death.

The geographical range of the Cougar, Panther or Catamount, is very extensive. About fifteen years ago, one was shot near Montpelier in Vermont, and a few have been occasionally observed in Massachusetts. Its present northern limits do not probably extend beyond New-York. To the south, its limits are not well defined. It is said to extend through the intertropical regions to Paraguay. It is far from being well established that the northern and southern species are identical.

GENUS LYNCUS. *Gray.*

Ears triangular, more or less tufted. Tail shorter than the head.

THE NORTHERN LYNX

LYNCUS BOREALIS.

PLATE X., FIG. 2.

Lynx Cat. PENN. Arct. Zool. Vol. 1, p. 50.
Lynx de Canada. CUV. Oss. Foss. Ed. altera. Vol. 4, p. 443.
Felis borealis. TEMMINCK, Monographie, p. 109.
F. canadensis. HARLAN, Fauna, p. 98.
The Northern Lynx. GODMAN, Am. Nat. Hist. Vol. 1, p. 302, figure.
Canada Lynx. RICHARDSON, F. B. A. Vol. 1, p. 101.
F. canadensis. EMMONS, Mass. Report, 1838, p. 27; 1840, p. 32.

Characteristics. Grey, with darker spots. Ears acute, margined with rufous and black. Tail shorter than the head. Soles hairy. Generally larger than the succeeding.

Description, (from a fine adult male in the Collection of Prof. Emmons.) Body raised high on its legs. Head large and rounded. Ears triangular, 2·0 high, 3·5 apart, with long black cylindrical tufts 2·3 high. Eyes large, 1·5 apart. Whiskers stiff, horizontal, arranged in two oblique series, some of the longest 3·5, and white; the posterior series brown horn-color. A broad ruff commences behind or rather beneath the ears, and surrounds the neck, except behind the ears, where there is comparatively a free interval; on the sides of the head it is short, but beneath it is from 3·5 to 4·0 long. (In the female, this ruff is much shorter, and not particolored.) The fur is of two kinds; a long fine wool, intermixed with longer subrigid hairs. On the line of the back, the fur is 1·5 long; on the belly it is loose and pendulous, and 4·5 long. Base of the feet so densely furred as to conceal entirely the soles and claws, which latter are white, long, curved, acute, and channelled beneath.

Color. The general color is grey, intermixed with rufous and black. Margin of the lips, upper margin of the nose and tip of the chin, bright rufous. Nose black, and slightly furrowed in the centre. Front of the head grey. Eyes yellowish in the living state. Ears white in front, margined with rufous, and behind this again bordered with black; posterior part of the ear, light ash; ear tufts black. Ruff white in front, and behind this it is longer and darker, approaching to black beneath; on the sides of the head it is shorter, with a greater admixture of rufous. On the back, the fur varies from reddish brown to blackish brown at the base; then dark brown or black, with hoary tips. Sides light fulvous at base, tipped with hoary. Anterior part of fore and hind legs, light fulvous. On the belly, the long loose hairs are soiled white, with a slight admixture of light fulvous at the base, and here and there scattered bunches of fulvous hairs. Tail rufous above for more than two-thirds of its length, tipped broadly with black; beneath rufous, mixed with lighter colored hairs.

Total length,.....	40·0.	Length of fore paws,..	3·5.
Length of head, ...	7·0.	Ditto of tail (vertebræ),	4·0.
Ditto of fore legs,..	13·0.	Ditto (including fur),..	5·0.
Ditto of hind legs,..	14·0.	Girth at foreshoulder, .	19·0.

This is the *Loup-cervier* of the early French writers, and the *Big Grey Wild-cat* and *Wolverene* of the New-York hunters. It is not uncommon in the northern districts of the State, preying chiefly on the northern hare and other small quadrupeds, and occasionally devouring lambs, pigs, etc. It is a timid animal, and is easily killed. Its progress is said to be a succession of leaps, lighting on all four feet at once, but not advancing with great rapidity: Hence it is probable that it usually obtains its prey by surprise. Contrary to the usual habits of its family, it has no dread of water, but swims well and for a long distance. It breeds once a year, and has two young at a time. Its flesh is tender, but insipid. Its fur is much esteemed, and a skin usually sells for from three to four dollars. It is strictly a northern animal. Its geographical range is between 66° and 43° north latitude.

THE WILD CAT, OR BAY LYNX.

LYNCUS RUFUS.

PLATE X. FIG. 1.—(STATE COLLECTION.)

The Bay Lynx. PENN. Arct. Zool. Vol. 1, p. 51. ID. Hist. Quad. Vol. 1, p. 303, pl. 60.
Mountain Lynx. ID. Arct. Zool. Vol. 1, p. 51. (Variety?)
Felis catus-ferus. LOSKIEL, p. 83.
Felis rufa. TEMMINCK, Monographie, p. 141.
Wild Cat. GODMAN, Am. Nat. Hist. Vol. 3, p. 239, (figure in vol. 1.) EMMONS, Mass. Rep. 1838, p. 27; 1840, p. 34.

Characteristics. A grey spot, bordered with black, behind the ears. Tail nearly as long as the head. Reddish yellow in summer, ashy brown in winter. Soles naked.

Description of an adult male. Head large and rounded. Body rather slender, with the legs disproportionately long. Ears large, subrotund, scarcely acute, with long hairs within; 2·8 high and 3·3 distant, with moderate black tufts scarcely an inch long. Whiskers numerous, about 2·0 long, and for the most part white. Length of the head 6·0, breadth 4·8. Fore legs 10·0 long, with five long, curved, acute, compressed, channelled claws of a greenish white color; the internal claw placed higher up, and rather more curved and robust than the others. Hind feet 12·0 long, with the soles uncovered, and with four claws resembling those on the fore feet. Tail rather slender, slightly curved upwards, and 5·5 in length to the tips of the hairs. The ruff of elongated hairs surrounding the neck, indistinct, and not so conspicuous as in the preceding species.

Female and young with imperfect tufts on the ears.

Color. Generally rufous, with various shades of brown, and darker along the dorsal line, being deepest about the middle of the back. Head obscurely lineated, with black between the ears. Eyelids black, margined with yellowish white. Sides of the nose white, with four

or five parallel narrow interrupted lines of black, running towards the cheeks. Ears fulvous in front, black behind, with a greyish spot in the centre, dilated towards the external margin of the ear. Tail above of the same general color of the upper parts of the body, indistinctly annulated on its sides with dark brown; beneath, white; tip, deep black, intermixed with a few white hairs. Outer sides of the legs rufous, obsoletely barred, and spotted with reddish brown. Insides of the fore legs soiled white, barred with black. (Pennant supposes these bars and the semi-annulated tail to be constant specific characters, but this does not accord with my observations.) Fore paws and hair between the soles, dark brown. Hind legs whitish on the inside, obscurely barred and spotted with black. Chin greyish; throat bright fulvous; belly whitish, irregularly spotted with black.

Total length,	36·0.
Length of head,	6·0.
Ditto of tail (vertebræ),	5·0.

This was a large individual, and, as I think, above the average size, and more distinctly marked than usual. It was captured in the Tonnewanda swamp, Genesee county. The females, I am induced to believe, either have no tufts, or lose them in summer. Even, however, in the case of the males, they can scarcely be considered as resembling the round elongated tufts of the other species.

I am indebted to Prof. Hall, of the Geological Survey, for the specimen which furnished the above description. Prof. Emmons describes this species as rufous, with the insides of the legs spotted with brown, and a triangular patch of yellowish white bordered with blackish behind the ears. Godman, describing the animal as deep reddish with small spots of blackish brown, speaks of nearly vertical streaks of black between the ears. I suppose the Mountain Cat described by Loskiel as having reddish or orange-colored hair, with black streaks, to have been the Bay Lynx.

The *F. rufa* of Richardson, from Columbia river, can not be referred to this species. Several species have been enumerated as inhabiting the United States; but as I have not had an opportunity to examine them, I must pass them over in silence. It is scarcely worth while to burthen our list of American animals with new names, proposed by greedy and unscrupulous writers, for animals which they have never seen, and only know from the brief notes of travellers. It would be desirable if the remarks of Temminck, cited below,* could be continually borne in mind by all writers, not only in reference to this, but every other genus.

The Wild Cat is one of the animals alluded to by Vanderdonck, as being very common in the Colony at its first settlement. A hundred and thirty years ago, they were so numerous in Suffolk county, as to require the interposition of the Legislature. An act was passed in the

* "Ceux qui veulent décrire les Chats sur des individus isolés, seront sans cesse exposés à multiplier les espèces. Il faut avoir vu un très-grand nombre de dépouilles, et s'être adonné à des recherches et à des comparaisons souvent renouvellées, pour émettre une opinion sur la difference specifique de ces animaux, si difficiles de distinguer les uns des autres." (*Monographies, &c.*)

General Assembly, to encourage the destruction of wild-cats; and in 1745, it was still found necessary to renew this act. At present, it is believed that they are entirely extirpated from this and the adjacent counties. They are still found in the more northern and western counties, in the wooded districts, where they prey upon birds and the smaller quadrupeds.

FAMILY VIII. PHOCIDÆ.

Teeth various. Feet short and fin-shaped, not free, the phalanges being enveloped in the teguments. Hind feet horizontal. Rarely leave the water. Piscivorous.

Obs. Some of the species are of great bulk, and all contribute in various ways to the wants of mankind. I am acquainted with the type of but one genus within this State.

GENUS PHOCA. *Cuvier.*

Head rounded. No external ears. Eyes very large. Feet with five toes, connected by a thick membrane. Mammæ two, pectoral. Tail short and thick. Teeth of three kinds: Incisors, $\frac{6}{4}$; *canines,* $\frac{2}{2}$; *cheek teeth,* $\frac{10}{10} = 34$. *Cheek teeth trenchant, many-lobed.*

Obs. To this genus, as restricted by Cuvier, belong at present about thirteen species, more or less perfectly indicated. The difficulty of examining the individuals of this family must be very great. A recent English writer states, that "little more is known of the Common Seal, "though an inhabitant of our own seas, than of those which are met with in the most distant "latitudes."

THE AMERICAN SEAL.

PHOCA CONCOLOR.

PLATE XVIII. FIG. 2.—(STATE COLLECTION.)

Phoca vitulina? MITCHILL, Am. Month. Mag. Vol. 3, p. 357.

Characteristics. Uniform dark slaty grey. Young, entirely light yellow. Length, four feet.

Description (*of a female caught in the Sound near Sands' Point.*) Body elongated, cylindrical, tapering gradually from the chest to the tail. Head broad and rounded, with the muzzle broad and truncated. Nostrils sublunate, 0·8 long. Tongue deeply emarginate at tip, and ciliated in the notch. Auditory opening 1·5 behind the eye, with a small mammillary elevation about 0·25 high on its anterior border. Whiskers white, with short bevels on the edges; disposed in five or six rows, the posterior stoutest and longest; from 4 – 6 in a group above, and somewhat behind the eye. In repose, the web of the fore feet extends almost to the tips of the claws; these are 1·5 long, gradually decreasing in size from the anterior: claws robust, flattened, incurved. When the web is extended, the edge is slightly webbed,

almost straight. Hind feet with short flattened claws, of which the three middle ones are smallest, none exceeding the membrane, which, when extended, is undulated or scolloped; under side, in a state of repose, gathered into two large folds. Tail spatulate, pointed, 2·5 wide at the base.

Teeth. Lower incisors disposed in a curved line, concave outwards; upper canines are strongest, and when the jaws are closed, include the lower. First cheek tooth small, trilobate; the others multilobate, and increasing in size backwards.

Color. Uniform dark slaty grey; but in the water, this appeared of a glossy blackish grey, slightly lighter beneath. Fore foot horn-color, mottled with darker. Young, soiled yellowish white, with indistinct traces of longitudinal marks.

Total length,	51·0.
Length of tail,	3·5.
Weight,	129 lbs.

We cite few synonimes, as we are inclined to believe that previous naturalists have taken it for granted, without due examination, that our Seal and the European are identical. Among the many American seals which we have examined, none have presented very distinctly the blackish or brown spots indicative of the *P. vitulina*, except in one specimen, which was evidently a pup of less than a year old.*

The Common Seal, or Sea-dog, as it is frequently called, breeds in the autumn, bringing forth commonly two at a birth. They are now comparatively rare in our waters, but were formerly very abundant. A certain reef of rocks in the harbor of New-York is called *Robin's reef*, from the numerous seals which were accustomed to resort there; *robin* or *robyn* being the name in Dutch for *seal*. At some seasons, even at the present day, they are very numerous, particularly about the Execution rocks in the Sound; but their visits appear to be very capricious. The seal noticed above had a nearly fully developed fetus; and as it was killed on the seventh of February, the time of parturition may be placed nearly about this period. Some authors assert that this takes place at any and every period of the year, but this seems highly improbable. Mr. Everson informs me that he has taken them, almost every year, in the River Passaic, in the fyke-nets, much to his regret; for they generally do great injury to his net, and always make an obstinate resistance. We have but few notices of seals on our coast, unless in mere paragraphs in the public journals, hastily drawn up by persons unacquainted with natural history. In the Kingston (U. C.) Chronicle of February, 1823 or '24, there is a notice of a seal having been taken on the ice on Lake Ontario, near Cape Vincent (Jefferson county) in this State. The paper gives no description, but asserts, on the

* When I drew up this description, I was not aware of the true specific characters assigned to the *Phoca vitulina* by Prof. Nillson, and have had since no opportunity of verifying them upon the Seal of the coast of New-York. These characters are, 1, the oblique position of the molar teeth, by which the internal posterior margin of one is in contact with the outer anterior margin of the next behind it; 2, the posterior margin of the palate deeply notched; 3, the external process of the nasal bone elongated and rounded, while the inner is not more than half the length of the former, and with its fellow makes a small triangle.

authority of Indian traders, that seals have heretofore been seen on the borders of the Lake, though the circumstance is one of rare occurrence. A species of seal was captured, some years since, near Lynn, Massachusetts, which is mentioned in the newspapers as being beautifully spotted, especially on the under side, and referred to the *P. vitulina*. In August, 1824, a seal was exhibited alive in New-York, which had been taken in a seine in the Chesapeake, near Elkton, Maryland. Dr. Mitchill, who saw it, supposed it to be the *P. vitulina;* although, as he states in a newspaper paragraph, "in the written account, (alluding to a "description he had drawn up in 1818 of a seal taken near Amboy,) there is no note "of the natural mark in the breast of the present creature, nor of more than five claws on "the fore feet." What this *natural mark* could have been, or what is meant by more than five claws, must be left to conjecture, or to await the examination of another individual.

GENUS STEMMATOPUS. *F. Cuvier.*

Form and habits of the preceding, but the head is furnished with a dilatable hood. Teeth 30; *four incisors above, and two beneath.*

Under the barbarous name of *Mirounga*, Mr. Gray has proposed to group together several species of this family, which are characterized by "the nose elongated into a trunk, and the "teeth with simple roots." In the present state of our knowledge of this family, we prefer the name and characters noted above.

THE HOODED SEAL.

STEMMATOPUS CRISTATUS.

PLATE XV. FIG. 1.

Phoca cristata. GMELIN.
Hooded Seal. PENN. Arct. Zool. Vol. 1, p. 162.
P. cristata. DE KAY, Ann. Lyc. New-York, Vol. 1, p. 94, pl. 7. KING & LUDLOW, ib. p. 99. HARLAN, Fauna, p. 106. GODMAN, Am. Nat. Hist. Vol. 1, p. 336, figure.
The Crested Seal. HAMILTON, Nat. Hist. Amphibious Carnivora, p. 197, pl. 14.

Characteristics. Grey, varied with brown. Nasal sac bright brown. Feet blackish brown. Length 6 – 7 feet.

Description. Body robust, cylindrical, tapering gradually to the tail, and covered with flattened decumbent hairs. Head small in proportion to the body, with a moveable muscular bag on its summit, extending from the muzzle to about five inches behind the eyes, and in certain positions nearly covering the internal canthi. This sac is twelve inches long, and when fully distended, nine inches high, covered with short hairs, and with slight transverse wrinkles. The nostrils are round, each two inches in diameter, and pierced in the anterior part of this hood. When the hood or nasal sac is not inflated, the septum nasi can be distinctly felt, elevated into a ridge about six inches high. Eyes large, distant 6·5 from the

extremity of the muzzle. Ear openings distinct, two and a half inches behind and beneath the eyes. The cheeks and nasal sac, with 25 – 30 strong whiskers on each side, arranged in rows converging forwards; those of the upper series, small and black; of the lower, very stout, white, flattened, and about 5·0 long: all directed downwards. Under the lens, they exhibit alternate short bevels on each side. Anterior swimming paws fifteen inches long, arising about twenty inches from the end of the jaw, and furnished with five strong, compressed, channelled claws, of which the external is largest. Posterior feet of same length, with their webs lunated, fifteen inches wide, and furnished with five flattened nails not extending, either in the fore or hind feet, to the end of the web. Tail three inches wide at base, flattened and tapering to the tip, and covered with hair similar to that on the body.

Teeth. The incisors above cylindrical, contiguous; the exterior largest, and nearly half as large as the canine; the upper canines larger than those below, and more incurved. The incisors below, very small and cylindrical. Cheek teeth in both jaws small, distant and trenchant, with a notch on the posterior part of the edge; the first remote from the canine, and smallest.

Color. Grey and dark brown, distributed in irregular patches; on the abdomen, the grey predominates. Eyes represented as dull greenish. Nasal sac bright brown or rufous. Fore and hind feet of a uniform blackish brown. Claws dark at base, light horn at their tips.

Total length,	90·5.
Length of tail,	6·5.
Weight,	5 – 600 lbs.

This description was taken from an adult male captured near Eastchester, about fifteen miles from the city. It made considerable resistance, emitted a bellowing noise when attacked, and exhibited no symptoms of fear.

This is an inhabitant of the northern regions, having been seen as high as the seventieth parallel. The preceding must be considered as the first notice of its existence within our territorial limits, where it can only be regarded as a rare and accidental visitor.

(*EXTRA-LIMITAL.*)

Genus TRICHECUS, *Lin.* Form and habits of the preceding genera. Four incisors above in the young, none below. Two canines enlarged into enormous tusks. Cheek teeth, $\frac{6}{4} - \frac{8}{4}$; the last above rudimentary, deciduous.

T. rosmarus. Walrus or Morse. (GODMAN, Vol. 1, p. 354, figure.) Tusks 12·0 – 36·0 long. Skin with short yellowish brown hair. Length 12 – 15 feet.

OBS. These were formerly numerous on our coast, but are now scarcely ever found south of Cape Sable.

(FOSSIL.)

T. virginianus. (Plate 19, fig. 1, A, B. Ann. Lyc. N. Y. Vol. 1, p. 271. Cab. Lyceum.) Cheek teeth with obliquely truncated crowns, not ridged; the second smaller than the first. *Accomac county, Virginia.*

ORDER IV. RODENTIA.

No canine teeth. Incisors for the most part two in each jaw, large, strong, and remote from the grinders. (In Leporidæ there are 2 – 4 – 6 in the upper jaw.) Cheek teeth twenty-two at most. Toes distinct, with small conical claws. Jaws moveable horizontally. The greater number furnished with stout clavicles. No abdominal pouch.

This order comprises a great number of the smaller quadrupeds, living almost exclusively on vegetable food. According to the latest enumeration, there are nearly three hundred species distributed over the globe. In North America, upwards of seventy species have been described; and we shall doubtless have many more to add to the list, for it is among these small quadrupeds that we are to find new species. We divide this order into five families.

FAMILY I. SCIURIDÆ.

Grinders simple, with tubercular summits. Upper incisors chisel-shaped; the lower pointed, compressed laterally. Incisors, $\frac{2}{2}$; *molars,* $\frac{8-10}{8} = 20$ *or* 22. *The fifth upper anterior molar exists only in the young.*

GENUS SCIURUS. *Linneus.*

Body elongated. Eyes large. Ears erect. Upper lip divided. Posterior extremities longer than the anterior, which have four long distinct toes, and a tubercle covered with an obtuse nail in place of a thumb. Eight teats; two pectoral, the remainder ventral. Tail long, with long bushy hair, often distichous or directed laterally.

Obs. All the species of this genus live mostly on trees; for which purpose, their long flexible toes, with acute nails, enables them to leap from tree to tree, rarely missing their hold. They feed on seeds, nuts, grain, and occasionally worms. About forty species have been described.

THE LITTLE GREY SQUIRREL.

SCIURUS LEUCOTIS.

PLATE XVIII. FIG. 1. — (STATE COLLECTION.)

Lesser Grey Squirrel. PENN. Hist. Quad. Ed. secunda.
Hudson's Bay Squirrel. Var. a, *Carolina.* PENN. Ib. Vol. 2, p. 147, Ed. tertia.
Hudson Squirrel. Var. a, *Carolina.* ID. Arct. Zool. Vol. 1, p. 116. (Variety.)
Sciurus cinereus. HARLAN, Fauna Am. p. 173.
S. carolinensis. GODMAN, Am. Nat. Hist. Vol. 2, p. 131, pl. fig. 2.
S. leucotis. GAPPAR, Zool. Journ. Vol. 5, p. 206. BACHMAN, Mag. Nat. Hist. 1839, p. 220.
Common or *Little Grey Squirrel.* EMMONS, Mass. Rep. 1840, p. 66.

Characteristics. Grey above, lighter beneath; sides of head and legs tinged with rufous. Ears not pencilled, soiled whitish behind. Tail rather longer than the head and body, edged with white. Length 15·0.

Description. Forehead arched. Ears somewhat pointed, but rounded, and covered with short hairs; no pencil of hairs at the tips. Whiskers black, as long as the head. Tail large and bushy.

Color. This is subject to great variations, depending upon age and season; but the following may be considered as tolerably constant: Above, bluish grey. Chin, throat and all beneath, white. The sides of the head and ears, the flanks, anterior part of the forelegs and the sides of the hind legs of a ferruginous or fawn-color of various shades of intensity, generally most conspicuous on the hind legs. Frequently on the lower part of the cheeks a bright fulvous spot, and occasionally an obscure stripe of brown on the back, reaching to the base of the tail. Tail edged with whitish. — Head and body, 8·0. Tail, 8·5.

Young. Space round the eyes, the nape, foreshoulder and flanks light reddish brown. Summit of the head, outer parts of the legs, the back and rump blackish. Belly and inner part of the legs brown. Tail blackish, intermixed with fulvous, and light fulvous on the margin. These are usually mistaken for hybrids between the black and grey.

Var. A. All the upper parts of the body tawny.

Var. B. Entirely dark brownish or black. This is taken frequently for the Black Squirrel, and by others supposed to be a hybrid between the *little grey* and *black*, but erroneously so. Common in various counties.

Var. C. A dark stripe on the flanks, margined above with reddish. *Rockland county.*

Var. D. Two reddish lateral stripes in both the adult and young, but more distinct in the latter.

Var. E. Abdomen bright ferruginous.

This well known little animal is found in every forest abounding in nuts of various kinds. They prepare their retreats in the hollow part of some tree, at a distance from the ground, and produce from four to six at a birth. In the season, they are exceedingly irritable and pugnacious; but the popular belief that the males emasculate each other, is unfounded, these parts (in the young more especially) being often retracted within the abdomen.

One of the most remarkable peculiarities of this species, is its singular and distant migration in large bodies. Bachman (*Op. sup. cit.* p. 226) has furnished an interesting account of an extraordinary migration of this sort, which he witnessed in the autumn of 1808, a short distance above Albany. On that occasion, troops of squirrels suddenly and unexpectedly made their appearance. They swam the Hudson in various places between Waterford and Saratoga. Those which were noticed crossing the river, were swimming deeply and awkwardly, with their bodies and tails wholly submerged. Many were drowned; and those which were so fortunate as to reach the opposite bank, were so wet and fatigued, that they were readily killed with clubs. On that occasion, their migration did not extend farther than

the mountains of Vermont. An unusual and general failure of their requisite food is, of course, the motive for such migration. This species, in common with the others, feed on berries, seeds and nuts, particularly hickory nut (*Carya alba*), of which they are very fond, and make large hoards for their winter supply. They also attack wheat and maize in its unripe state. Their depredations in this way are often so considerable that parties of men and boys sally forth for what is called a *squirrel hunt*, and almost incredible numbers are thus destroyed in a single day. In districts well peopled, it can scarcely be considered as a species injurious to man.

The Squirrel has a wide geographical range. Of its western limits we are not informed; but along the Atlantic, it is found from Hudson's Bay to Carolina.

THE FOX SQUIRREL.

SCIURUS VULPINUS.

PLATE XVIII. FIG. 3.—(STATE COLLECTION.)

Sciurus vulpinus. GMELIN.
The Fox Squirrel. GODMAN, Am. Nat. Hist. Vol. 2, p. 128.
S. vulpinus. Grey or *Fox Squirrel.* EMMONS, Mass. Report, 1840, p. 66.

Characteristics. Grey above, white beneath. Much larger and more robust than the preceding. Length 25·0 – 30·0.

Description. Body robust. Eyes large and prominent. Ears 0·6 high; the hair on the posterior surface projecting 0·2 beyond the margins, but not forming a distinct tuft or pencil. The whiskers project horizontally two inches on the sides of the nose; a few bristles over the eyes, and a patch of the same beneath and posterior to the eyes. Legs robust, with stout, compressed, curved, dark brown claws. Tail exceedingly voluminous.

Color. Sides of the nose, the chin, throat and abdomen white. Summit of the head blackish, occasioned by the predominance of long uniformly black hairs. Sides of the cheeks fulvous; the hair on the ears of a somewhat brighter tint. Nape and all above of a grey color, the hair being dark slate at the base, then light fawn, afterwards black, and finally white at the tips; intermixed with these, and much longer, are hairs uniformly black throughout. Anterior parts of the extremities light fawn, becoming still lighter on the toes. Tail indistinctly annulated with black and white, and when viewed from above, appears bordered on each side with black, the white tips of the hairs projecting beyond this margination. Each hair is distinctly annulated with white and black; the last black annulation preceding the white tip being wider, and of a deeper hue than the others.

Length of head and body,	13·0.
Ditto of tail (vertebræ),	11·5.
Ditto ditto (including fur),	15·5.

Many persons imagine that this is but a larger race or variety of the Little Grey Squirrel; and indeed they agree in every particular, except their size. We suspect that Godman's *Fox Squirrel*, as well as his *Cat Squirrel*, are varieties only of the Hooded Squirrel, and not to be referred to our northern animal. Prof. Emmons states that its flesh is not so sweet or white as that of the little grey squirrel. Varieties are occasionally met with, tawny, and dark brown. Its habits and geographical distribution are the same as in the preceding.

THE BLACK SQUIRREL.

SCIURUS NIGER.

PLATE XVII. FIG. 1.

Sciurus niger. SAY, Long's Exped. Vol. 1, p. 262. HARLAN, Fauna, p. 177, (excl. syn.) GODMAN, Am. Nat. Hist. (excl. syn.) Vol. 2, p. 133, figure.
Black Squirrel. RICHARDSON, F. B. A. Vol. 1, p. 191.
S. niger. BACHMAN, Mag. Nat. Hist. 1839, p. 335.
The Black Squirrel. EMMONS, Mass. Report, 1840, p. 67.

Characteristics. Entirely glossy black; a shade lighter beneath. Claws covered with hair. Hind legs with a few scattering hairs beneath. Length 12·0 – 14·0.

Description. Body more gaunt and slender than in the Little Grey Squirrel, and the head narrower between the eyes. Ears 1·3 apart, broad, with the posterior slope nearly straight; tips subacute, not pencilled, but with hairs of the posterior surface extending beyond them. Whiskers in two series on the sides of the nose, longer than the head, two or three above the eyes, and a patch of three or four on the cheeks. Outer and inner claws of fore feet subequal, the outer slightly shortest; a few long black hairs on the posterior part of the fore legs; the two middle claws of the hind feet equal; posterior part of hind leg nearly naked. Tail cylindrical, scarcely distichous. Fur softer and finer than in the little grey squirrel. Molars eight above.

Color. Glossy jet black. Base of the fur above, deep slate; beneath, it is light grey. Palms flesh colored.

Length of head and body,	13·0.
Ditto of tail (vertebræ),	10·0.
Ditto ditto (including fur),	13·0.

It is usually supposed that the winter fur of this species is most intensely and generally black. The homogeneousness of color may be found at all seasons; for we have killed them in July and August, in the western part of the State, intensely black.

The confusion alleged to exist in the descriptions of our Squirrels, and more especially in relation to this species, may be thus explained: Catesby (Nat. Hist. Car. Vol. 2, p. 73) figured a species, subsequently known as a variety of the Hooded Squirrel, *S. capistratus*. Linneus, in his twelfth edition, gives it the name of *niger*, citing Catesby, but without any

specific phrase. Brisson (Règ. An. Vol. 1, p. 105) refers to the same plate, which he pronounces excellent. Pennant (Arct. Zool. Vol. 1, p. 119) adopts the same course, considering it as *S. niger*. In this he is copied by Erxleben (p. 417), and by Schreber (Saugth. Vol. 2, p. 776), which latter reproduces Catesby's figure. The dark brown or black variety of the Little Grey Squirrel has also been described as the *niger;* and from these various sources, so much confusion has arisen, that Cuvier, in the first edition of his *Règne Animal*, supposes the black and little grey squirrels to be varieties of *capistratus*. In the second edition, he is silent on the subject, and his American editor supposes the black squirrel to be a variety of the grey. In the catalogue at the end of the volume, which is understood to have been furnished by Major Le Conte, the Black Squirrel, as a species, is suppressed. Harlan, Godman and Richardson, have very properly restored it to its place in the systems. Precise technical naturalists may, however, deem it proper to restore the name of *niger* to *capistratus*, and give the present species a new name. They are, however, now so firmly established and generally known, that little would be gained by the change. It appears to be well authenticated that it disappears before the little grey squirrel. We have been assured by many credible persons, that in certain districts where formerly none but black squirrels were seen, their place is now almost exclusively occupied by the grey squirrel.

This species appears to have but a limited latitudinal range. It is found throughout the western counties of the State. Few are found south of Pennsylvania. Westwardly its distribution has not been ascertained. Habits the same as the preceding.

THE RED SQUIRREL.

SCIURUS HUDSONICUS.

PLATE XVII. FIG 2.—(STATE COLLECTION.)

Hudson's Bay Squirrel. PENNANT, Arct. Zool. Vol. 1, p. 116. ID. Hist. Quadr. Vol. 2, p. 147.
Sciurus hudsonicus, Var. e, *vulgaris*. ERXLEBEN, p. 416.
Red Squirrel. WARDEN, Hist. U. S. Vol. 1, p. 330.
Red Barking Squirrel. SCHOOLCRAFT, Journal, p. 273.
S. hudsonius. HARLAN, p. 185. GODMAN, Vol. 2, p. 138, figure.
The Chickaree. RICHARDSON, F. B. A. Vol. 1, p. 187, pl. 17. BACHMAN, Mag. Nat. Hist. 1839, p. 383.
Common Red Squirrel. EMMONS, Mass. Report, 1840, p. 67.

Characteristics. Reddish above, white beneath. Ears slightly tufted. Tail shorter than the body.

Description. Forehead rounded. Whiskers numerous, black, longer than the head. Ears short, broad and rounded; furnished with long hairs projecting beyond the margin, but rarely, if ever, distinctly tufted. Legs robust; fore feet with the rudiment of a thumb nail. All the claws sharp, compressed, and much incurved. Teeth as in the other squirrels; that is to say, ten molars above, the deciduous molar falling very early. Tail not as long as the head and body, not very bushy, and somewhat distichous.

Color. Above deep reddish brown, with scattering darker hairs; dark grey at base.

Cheeks, and all beneath, white, separated along the flanks by a black line, which in some individuals is very indistinct: in specimens from high northern latitudes, it appears to be generally absent. Tail deep reddish brown above, with blackish hairs on the borders; on the under side it is rufous in the middle, then black, and tipped with brown.

Length of head and body,	8·0.
Ditto of tail (vertebræ),	5·0.
Ditto ditto, including fur,	6·5.

This familiar and well known species is found from the Arctic circle to the mountainous ranges of North Carolina and Tennessee. We observed, in the northern part of the State, a remarkable variety, which presented the following appearance: The whole upper part of the head and body, with the exception of a large reddish spot on the left flank, was of a light ash grey; the reddish spot was separated from the white beneath, by a deep black border. Tail white, intermixed with a few dark hairs.

The Red Squirrel is a noisy little animal, and its twittering note of *chick-a-ree* has suggested one of its popular names. It feeds on fir-cones, hickory and other nuts, and also on the seeds and buds of trees. In the northern counties, its greatest enemy is the Sable, and from him it requires all its well known agility to escape. It takes to the water readily, and, as we have noticed, swims tolerably well. It dives, too, in order to avoid a threatened blow. It feeds also upon wheat, rye and buckwheat; but its injuries to the farmer must be very limited. Its habits appear to be influenced by the climate; for at the north it forms deep burrows in the earth, under the roots of trees, to protect itself from the cold; whilst in this State, it contents itself with occupying a hollow in a tree. Its flesh is juicy and tender, and is generally preferred, as an article of food, to the other species. Its geographical range is from the mountainous districts of North Carolina, to the sixty-eighth degree of north latitude.

THE STRIPED SQUIRREL.

SCIURUS STRIATUS.

PLATE XVI. FIG. 1.—(STATE COLLECTION.)

Sciurus striatus. LIN. 12th ed. p. 87.
Striped Dormouse. PENN. Arct. Zool. Vol. 1, p. 126.
Das Schwartz Gestreichte Erd-Eichhorn. SCHREBER, Vol. 2, p. 790.
S. striatus. HARLAN, p. 183. GODMAN, Vol. 2, p. 142, figure.
S. americanus. KUHL.
S. (Tamias) lysteri. RICHARDSON, F. B. A. p. 181, pl. 15.
The Striped Squirrel. EMMONS, Mass. Report, 1840, p. 68.

Characteristics. Reddish brown; a black dorsal stripe, and a shorter light-colored lateral stripe bordered with black.

Description. Body shorter and more robust for its size, than in the preceding species. Head slightly rounded towards the nose. Ears ovate, rounded; the hair slightly exceeding the mar-

gins, but not in a tuft. Whiskers few, and extending beyond the eyes. Fore feet with four compressed, curved claws, and the rudiments of a thumb; the two middle claws longest and subequal, all partially covered with hair; soles with five tubercles. Hind feet long, with the three middle toes subequal. Tail slender, rather cylindrical above, distichous on its lower surface. Molars eight above. Dilatable cheeks, not forming distinct pouches.

Color. Forehead tawny mixed with black, with a small black spot above the nose. A slight whitish mark above and beneath the eyelids, becoming dilated towards the ears, with an intermediate black dash in the same direction passing through the eye. Upper part of the neck, anterior part of the back, and superior surface of the tail, grey mixed with black. Flanks greyish, passing into reddish on the rump and thighs. The cheeks, throat, breast, belly and internal parts of the fore legs and thighs, white more or less mixed with light ash. A narrow chesnut brown dorsal stripe commences between the ears, becomes dilated and darker on the back, and ends about an inch from the tail. A short white stripe is parallel with this on each flank, bordered above and below with black, the lower black border frequently much dilated. These longitudinal markings are frequently treated as composed of five parallel black lines. The space between the lateral and dorsal stripes grey. Rump bright tawny. The under side of the tail fulvous, bordered with black and grey.

Length of head,	1·7.	Of tail (vertebræ),	3·8.
Ditto of body,	5·5.	Ditto (including fur),	4·5.

This common species is well known under the various popular names of *Hacky*, *Ground Squirrel*, *Chipping Squirrel*, *Chipmuck;* the latter, we apprehend, being its aboriginal name in this State. There appears to be a doubt with some naturalists, whether the Asiatic and American animals are identical. Dr. Richardson appears to consider their identity as not yet proved by actual comparison, and proposes for the American the name of *Tamias lysteri*, giving Ray the authority for the specific name. The descriptive history of this species appears to be this: It was originally noticed by Ray in 1683, in his *Synopsis Methodica Animalium*, p. 216, without giving it a name. "Huic (*S. getulus*, Caii apud Gesnerum, the "Barbary Squirrel) similis est Sciurus a Cla. Dom. Lyster observatus, et sic descriptus: "Sciurus e minoribus est rufis cineriisque pilis fere ad similitudinem vulgaris muscovitici "coloratur; in medio dorso unica linea ex toto nigra; itemque ad utrumque latus altera eaque "latiusculæ quidem, at multo brevioriis earumque etiam media albicant. Huic cauda brevis, "corpore concolore at nigrior, et raris pilis donatus, etc." It was subsequently noticed by Edwards & Catesby; by Linneus, in 1754; in the *Mus. Ad. Fred.*, by Pallas; by Schreber, in 1755; and in the last correct edition of the *Systema*, 1766, Linneus describes *striatus*, quoting Catesby & Edwards, and considering their animal as identical with that of Siberia. Desmarest (*Dict. Sc. Nat.* Vol. 52, p. 170) appears to doubt whether they are identical. We may here remark, by the way, that his description of the American *striatus* appears to have been drawn up from a young or very small specimen. From Daubenton's description of the Asiatic species, the chief differences appear to be the following: In the latter the tail is black towards the extremity, tipped with white; the intermediate space between the dorsal

and lateral stripes, light yellow. These are trivial differences, such as might occur between two individuals of the same species. The size of the two species sufficiently coincide.

The laborious compiler Schreber describes carefully the Asiatic Squirrel, and the following appears to be the principal points: "Eyelids bare and dark brownish on the margins. Color "of the head, neck, sides and outer part of legs yellowish (griseo-lutescens.) On the sides of "the head are four alternate pale and brown stripes. Tail above blackish, beneath yellowish; "along its sides, a darkish obsolete border, etc."

The genus *Tamias* of Illiger, we deem founded on unimportant or insufficient character, if applied to our species. Its habits might seem to imply an organization somewhat different from the other squirrels; but neither the slight difference in the deciduous upper anterior molar, nor the situation of the brain, are of themselves sufficiently important. The tail of the Ground Squirrel is distinctly distichous; and the cheeks, though susceptible of great dilatation, do not form true cheek pouches.

The Ground Squirrel is usually seen running along fences, and particularly attached to stone walls, which afford him a ready retreat. Under these he makes his burrow, in which he lays up his store. A favorite spot is the centre of some decayed stump. It rarely ascends trees, and only when its retreat is cut off from its hiding place. It appears to be of an irritable disposition, resisting every attempt at domestication. Its food is the same as with the other species. It is stated by Prof. Emmons to be occasionally injurious to maize, by destroying the kernel when the plant is just out of the ground.

It is common over all the State. Its geographical range, in this country, appears to be included between the fiftieth and thirty-third parallels of latitude.

(*EXTRA-LIMITAL.*)

S. carolinensis, Bosc. (Bachman, Mag. Nat. Hist. 1839, p. 330.) Rusty grey, white beneath; ears nearly naked; anterior molar in upper jaw persistent. Tail as long as head and body. Smaller than *leucotis*. Length 17·0. *Southern States.*

S. macrourus. (Say, Long's Exp. Vol. 1, p. 115.) Black and grey above. Tail very large. Length 19·0 – 20·0. *Missouri.*

S. auduboni. Black above, beneath brownish. Tail equal to length of head and body. Smaller than *niger*; ears shorter. Length 23·0. *Louisiana.*

S. quadrivittatus. (Say, *Op. cit.* Vol. 2, p. 45.) Head with four white stripes; on the back, four broad white lines alternating with darker ones. Head and body 4·2; tail 3·0. Allied to *striatus*. *Rocky Mountains.*

S. fuliginosus. (Bachman, *Op. cit.* p. 380.) Black above, grizzled with brownish yellow. Tail flattish, much shorter than the body. Length 18·5. *Mississippi.*

S. richardsonii. (Bachman, p. 386. Lewis & Clark.) Rusty grey above, whitish beneath; end of tail black, and shorter than the body. Length 11·2. *Rocky Mountains.*

S. douglasii. (Bachman, *Op. cit.* p. 382.) Dark brown above, brighter buff beneath. Tail shorter than the body. Length 14·6. *Columbia River.*

S. capistratus. (Fox Squirrel of Bachman, p. 117.) Usually grey; ears and nose white; fur coarse. Tail longer than head and body. Length 29·5. Largest of the genus. *Southern States, New-Jersey.*

S. lanuginosus. (Bachman, p. 387.) Yellowish grey above, silver-grey on sides, beneath white. Tail shorter than the body. Palms and inner surface of toes thickly clothed with silky hairs. Fur soft and downy. Length 14·0. *Columbia River.*

S. nigrescens. (Bachman, p. 334.) Black above, slightly varied with grey; sides of the neck, upper part of thigh and rump pale yellow, beneath soiled grey; feet black. Tail longer than body. Length 27·5. *California.*

S. collei. (Richardson, App. Beechy.) Above varied with black and yellow, beneath white; feet white; cheeks greyish. Tail less than length of head and body. Length 20·1.

GENUS PTEROMYS. *Illiger.*

Teeth as in the preceding genus. Ears round. Upper lip divided. Toes elongated, deeply divided. The skin dilated on the sides from the fore to the hind legs, forming a sort of parachute in the air.

Obs. This genus at present embraces nine species, of which two are found in America, one in northern Europe, and the remainder in Java. Some of the species are nocturnal.

THE SMALL AMERICAN FLYING SQUIRREL.

Pteromys volucella.

PLATE XVI. FIG. 2 — (STATE COLLECTION.)

Sciurus americanus volans: Ray, Synop. Quad. p. 215.
Flying Squirrel. Penn. Hist. Quad. Vol. 2, p. 153, No. 351.
Sciurus volucella. Gmelin.
Flying Squirrel. Penn. Arct. Zool. Vol. 1, p. 120.
Pteromys volucella. Harlan, Fauna, p. 187.
Common Flying Squirrel. Godman, Am. Nat. Hist. Vol. 2, p. 147, figure. Emmons, Mass: Report, 1840, p. 69.

Characteristics. Brownish ash, tinged with cream color on the body, above; darker on the membrane, which is bordered with white. Length 9·0 – 10·0.

Description. Head short and rounded; muzzle rather obtuse. Ears large, broad, membranous, nearly naked, and 0·5 high. Eyes large, brilliant and prominent. Whiskers numerous, some of them three inches in length. Claws feeble, compressed, convex and acute, nearly covered by hairs; the two middle claws of the fore feet subequal, longest on the hind feet, the inner toe shortest. Tail flat, distichous, linear, rounded at the tip, 1·2 broad. The fur particularly fine and soft; on the extremities beyond the membrane, it is very short.

Color. Head mouse-grey. Orbits of the eyes margined with black. Sides of the nose, cheeks, and all beneath pure white, with occasionally a slight tinge of reddish on the under

side of the tail. Body above with a rufous tint, the dark slate-colored hairs being tipped with that color. On the upper side of the flying membrane, the predominating color is dark brown, varied slightly with faint reddish brown, becoming darker near the edge, which is bordered with white, and occasionally cream-color. Tail, on its upper surface sometimes bright reddish, at other times uniform with the color of the back.

Length of head, ...	1·3.	Of tail (vertebræ), ...	4·0.
Ditto of body, ...	4·0.	Ditto (including fur), ...	5·0.

The dimensions of this squirrel are usually smaller than in the specimen from which the above description was taken.

The Flying Squirrel is well known throughout this State. The expanded fold of skin is in many species supported by a small bone, articulated to the wrist. In the American species, this is rudimentary. By the aid of this membrane, they are enabled to dart from one tree to another, not by an actual movement of the membrane, as we have seen among bats; but by sailing obliquely downwards, and rising suddenly when within a few inches of the tree upon which they mean to alight. In this sailing movement, they are aided, and perhaps slightly guided by their broadly expanded tail. They form their nests in hollow trees, from which they are easily roused by striking on the trunk. They are of a gentle disposition, and easily domesticated; are fond of warmth, and will sleep during the whole day, closely pressed against the body of their master. At twilight they arouse themselves, and afford much entertainment by sailing about the room, always commencing their flight by climbing to a chair, table or shelf. It brings forth three or four at a litter, and lives exclusively on nuts, seeds and buds. It does not appear to be found far beyond the great lakes, but extends through the United States. According to Lichtenstein, it occurs in Mexico.

(*EXTRA-LIMITAL.*)

P. sabrinus. (Richardson, Vol. 1, p. 193, pl. 18.) Resembles the preceding, but is much larger. Length 12 inches. *Arctic America, Sault St. Marie.*

P. oregonensis. (Bachman, Ac. Sc. Vol. 8, p. 101.) Ears longer than in *sabrinus.* Brown above, beneath white. Length 12 inches; alar extent 9 inches. *Oregon.*

FAMILY II. ARCTOMIDÆ.

Head large, and somewhat flattened. Ears short and rounded. Molars ten above and eight below; anterior surface of incisors rounded, the upper surface ridged and tuberculous. Body thick and heavy, with short limbs. Tail bushy, moderate or short. Some species with cheek pouches. All burrow and hybernate.

This group, which is closely allied to the Squirrels, comprises many small animals, which have been indifferently referred to Squirrels or Marmots. America is particularly rich in species, but few are found within the limits of the Union, and but one within our State.

(*EXTRA-LIMITAL.*)

Genus SPERMOPHILUS, *F. Cuvier.* Ample cheek pouches, commencing at the commissure of the lips, and extending to the sides of the neck; the anterior ridge on the upper cheek teeth nearly obsolete, and the internal spur much developed. Tail long and linear, bushy.

S. tredecimlineatus, Mitchill. (RICHARDSON, pl. 14.) Six to eight yellowish longitudinal stripes, the intermediate spaces with black spots. Length 8 – 10 inches. *St. Peter's River.*

S. lateralis. (SAY, Long's Exped. Vol. 2, p. 46. RICHARDSON, pl. 13.) A yellowish white stripe on each flank, bordered with black. Length 10 – 12. *Rocky Mountains.*

S. douglasii. (RICHARDSON, Vol. 1, p. 172.) Hoary brown above, with a black stripe between the shoulders; pale brown behind, with indistinct black marks. Length 12 – 13. *Columbia River.*

S. beecheyi. (RICHARDSON, pl. 12. B.) Above reddish varied with blackish, beneath brownish yellow. Tail long, bushy and round. Length 17 inches. *California.*

S. franklini. (RICHARDSON, pl. 12.) Yellowish brown above, thickly spotted with black; greyish white beneath. Tail long. Length 16 inches. *Arctic Regions.*

S. richardsoni, Sabine. (RICHARDSON, pl. 11.) Yellowish grey above, varied with black; beneath pale orange; very short ears. Length 16 inches. *Arctic Regions.*

S. grammurus. (SAY, Long's Exp. Vol. 2, p. 72.) Cinereous tinged with reddish; fur coarse and flattened. Three black lines on the tail. Length 21 inches. *Rocky Mountains.*

S. guttatus, Temminck. (RICHARDSON, Vol. 1, p. 162.) Clove-brown above, spotted with white; beneath and feet ochraceous; no external ears, and short tail. *An Spermophilus?* Length 10 inches. *Rocky Mountains.*

S. parryi. (RICHARDSON, pl. 10.) Greyish above, pale rust-color beneath; face chesnut-color; ears short; tail flat. Length 16 – 18 inches. *Hudson's Bay, Behring's Straits.*

S. ludovicianus, Ord. (GODMAN, Vol. 2, p. 114, plate.) *Prairie Dog.* Reddish brown above, mixed with grey and black; beneath soiled white. Tail short, banded with brown near the tip. Length 19 inches. *Missouri.*

GENUS ARCTOMYS. *Linneus. Gmelin.*

Form, habits and teeth of the preceding. Cheek pouches rudimentary. Living in societies. Fore feet with four distinct toes and the rudiments of a thumb; hind feet with five toes, and all furnished with strong hooked and compressed nails. Tail bushy.

OBS. The distinction between this and the preceding genus is exceedingly obscure.

THE WOODCHUCK.

ARCTOMYS MONAX.

PLATE XXI. FIG. 4.—(STATE COLLECTION.)

Mus monax. LIN. 12 Ed. p. 81.
Arctomys. GMELIN.
Maryland Marmot. PENN. Arct. Zool. Vol. 1, p. 111.
Arctomys monax. HARLAN, Fauna Amer. p. 158.
Maryland Marmot. GODMAN, Am. Nat. Hist. Vol. 2, p. 100, figure. GRIFFITH, Règne Animal de Cuvier, Vol. 3, p. 170, figure.
The Woodchuck. RICHARDSON, F. B. A. Vol. 1, p. 153. EMMONS, Mass. Report, 1840, p. 64.

Characteristics. Adult, reddish grey; head and neck reddish brown; sides of the nose ashy; beneath bright reddish. Tail uniform with the body, its tip slightly darker, Young, rufous, or uniform black.

Description. Body robust and clumsy. Head broad, conical, tapering suddenly to the snout, which is blunt and somewhat truncated. Ears short, broad and rounded as if truncated, two and a half inches apart; hairy within and without. Eyes moderate, black. Whiskers numerous, two and a half inches long; a group of three or four over the eyes, and a more numerous collection on the posterior part of the cheek beneath the ears. Toes well divided and long. On the fore feet the claws are longest, slightly curved, and the one next to the internal longest. Thumb rudimentary, with a small nail. Hind feet semipalmate, with the claws channelled towards the tips, the three middle claws subequal; palms of the fore feet with five tubercles, three in front and two larger behind. On the hind feet, four irregular tubercles at the base of the toes, and two or three unconspicuous ones behind. Length of the soles, 2·5. Tail bushy, sub-distichous, expanded towards the tips. Fur composed of a short wool, and mixed with coarse hairs, which are longest on the foreshoulders and flanks; on the head, chin and feet, short, subrigid and adpressed.

Color, subject to many variations, but the following are most constant: The short fur is dark brown at base, and ferruginous at the tip; through this appear long subrigid hairs, black for two-thirds of their length, and white at the tips. From this results a color which may be designated as reddish grey. On the summit of the head the color is of a uniform shining reddish brown, being ferruginous where it joins the grey of the back; the reddish brown extends beneath the eyes, and within 0·5 of the extremity of the nose. The chin and space around the nose, ash grey; the nose brown. Upper parts of the fore and hind legs and body beneath, deep reddish. Feet covered with blackish brown hairs. Tail resembling in color the upper part of the body, darker towards the end, which is tipped with reddish. From a remarkably fine adult specimen caught in May, and of which we have given a figure, we are enabled to add the following particulars: On the back the hair dark slate at the base, and light rufous at the tips; the longer hairs are black, annulated near the tips with grey; hence results a general dusky grey on the anterior part of the back, the flanks, sides of the neck,

and exterior of the thighs. Summit of the head, spaces round the eyes, and on the rump and tail, dark brown; chin, space around the nose, and a few scattering hairs at the internal base of the ears and over the eyes, grey. Throat, abdomen and superior parts of the extremities with long, shaggy, bright reddish hairs. Feet dark brown, approaching to black. Ears with sparse hairs on both sides, projecting beyond the margins. A few of the black whiskers, and those above the eyes, extend as far as the ears. Tail deep brown, with a shade of dark rufous.

Length of head,	4·5.	Length of fore claw,	0·6.
Ditto of body,	12·5.	Ditto of hind claw,	0·5.
Ditto of tail (vertebræ),	5·5.	Height of ear,	0·6.
Ditto, including fur,	7·3.	Width of ditto,	0·8.
Height,	7·0.	Girth of body,	16·0.

The young exhibit great varieties in their markings. Three apparently not fully grown woodchucks, which I obtained from the hemlock forests about Oneida lake, and which were taken from the same burrow, and measured from 10 – 11 inches in the length of their head and body, exhibited the following appearances:

No. 1. All the upper parts of the body and tail rufous, varied with grey; beneath bright rufous.

No. 2. Uniform jet black above and beneath, except the space surrounding the chin and mouth, which was cinereous grey.

No. 3. Summit of the head, posterior portion of the back and tail dark brownish. Throat, sides of the neck, anterior part of the back, the foreshoulders and flanks, grizzled with long hoary hairs. Beneath, bright fulvous. Tail dark brown above and beneath.

The Woodchuck, or *Ground-hog*, as it is sometimes called, is common in almost every county in the State. In some places it appears to select pine forests for its abode; and in others, it appears to prefer cleared lands and old pastures. It feeds on clover and other succulent vegetables, and hence is often injurious to the farmer. It is said to bring forth four or five young at a litter. Its gait is awkward, and not rapid; but its extreme vigilance and acute sense of hearing prevent it from being often captured. It forms deep and long burrows in the earth, to which it flies upon the least alarm. It appears to be social in its habits; for, upon one occasion, we noticed some thirty or forty burrows in a field of about five acres. These burrows contain large excavations, in which they deposit stores of provisions. It hybernates during the winter, having first carefully closed the entrance of its burrow from within. It is susceptible of domestication, and is remarkable for its cleanly habits. Its cheeks are susceptible of great dilatation, and are used as receptacles for the food which it thus transports to its burrow. Its range, as far as we have been enabled to ascertain, is from Maine to Carolina. It probably extends through the western States.

We have never seen the Quebec Marmot noted beneath, although we have heard that it has been found in this State. We find no specific difference between it and the woodchuck, except in the color. From the description given by Richardson, which is the most recent and complete, it bears a great resemblance to No. 3 noted above.

(*EXTRA-LIMITAL.*)

A. empetra. (RICHARDSON, pl. 9.) Hoary above, reddish orange beneath; cheeks whitish. Tail brown and hoary, with a black tip. Size of *monax*. *Northern Regions.*

A. pruinosus. (RICHARDSON, p. 150.) Long coarse fur, especially on the back and shoulders, where it is hoary; hind parts dull yellowish brown. Tail bushy, blackish brown. Size of preceding. *Rocky Mountains.*

A. brachyurus. (HARLAN, p. 304.) Above brownish grey tinged with red, and speckled with lighter; nose, feet and under side of body brick red. Tail flat, red above, with a white margin. Length 17·0. Tail 2·5. *Columbia River.*

FAMILY III. GERBILLIDÆ.

Fore feet very short. Hind feet disproportionately long. Tail generally longer than the body. Molars with tubercular crowns, 6 – 8 beneath.

OBS. This forms a small but distinct group, comprising at present about ten species, included under three genera.

GENUS MERIONES. *Illiger.*

Consisting of small species. Tail very long, slender, and nearly naked. Molars beneath six. Fore feet with a rudimentary thumb, with a small nail. Hybernate. Nocturnal.

THE DEER-MOUSE.

MERIONES AMERICANUS.

PLATE XXIV. FIG. 2.—(STATE COLLECTION.)

Labrador Rat. PENN. Arct. Zool. Vol. 1, p. 132.
Dipus americanus. BARTON, Am. Philos. Trans. Vol. 1, p. 114, figure.
D. canadensis. DAVIS, Lin. Trans. Vol. 4, p. 155, pl. 8, figs. 5 and 6.
Gerbillus canadensis et labradorius. HARLAN, Fauna Am. p. 155. GODMAN, Am. Nat. Hist. Vol. 2, p. 91, figure.
Meriones labradorius. RICHARDSON, F. B. A. Vol. 1, p. 144, pl. 7.
Gerbillus canadensis. EMMONS, Mass. Report, 1840, p. 69.

Characteristics. Dark reddish brown above, yellowish on the sides; beneath whitish, tinged with yellow. Length 8·0 – 9·0.

Description. Head narrow, conical, with a small projecting black muzzle covered with short rigid hairs, leaving a naked space about a tenth of an inch wide. Nostrils small, oval and lateral. Mouth beneath. Whiskers long and black, extending to the ears, and even beyond them, with a few scattering hairs before the eyes. Ears suboval, nearly a quarter of an inch long. Eyes very small. Fore feet feeble, 0·5 long, with four white, sharp, com-

pressed straight nails, of which the internal is shortest; a small rudimentary thumb near the base of the inner toe. Hind legs slender, nearly two inches long; the anterior surface covered with short white hair. Tail long, slender, cylindrical, scaly, with short rigid adpressed hairs; slightly enlarged at the base, a few hairs extending 0·3 beyond the tip, which is not, however, tufted. Fur short, not remarkably fine, longest on the posterior parts of the body. Teeth: Incisors, $\frac{2}{2}$; molars, $\frac{3}{6} = 18$. The upper cutting teeth yellowish, and so deeply channelled in the centre as to produce an impression at first that there are four incisors above. The anterior molar above, and the posterior beneath, smallest.

Color. Head dark brown above. Ears margined with fulvous. Space beneath the nose on each side, white. In some specimens this is yellowish, and forms a yellow stripe extending backwards towards the ears. On the upper part of the body a broad dark brown dorsal stripe, becoming yellowish on the sides and whitish beneath. These colors are almost distinctly separated. The dark color of the back is produced by intermixture of numerous black hairs on a fulvous ground. Base of hairs on the head, back and sides slate-colored. The white of the belly not unfrequently mixed with cream-color; and where it unites with the hair on the sides, it is bright rufous. Tail white beneath, separated distinctly from the brown above.

Length of head,	1·0.
Ditto of the body,	2·0.
Ditto of the tail,	5·0.

This curious little animal, although rarely seen, is not uncommon in every part of the State. It was first noticed by Pennant; and subsequently, either this or a closer allied species was described by Zimmerman in 1780, under the name of *Dipus hudsonius*, but we have had no opportunity of consulting his description. For the next notice we are indebted to Dr. Barton, with a figure. Two years afterwards, Davis published a meagre notice, with a figure. Sabine's *labradorius* was drawn up from a mutilated specimen. From the confusion existing in relation to this animal, it appears to be probable that many strongly marked varieties, and, as we have seen, imperfect specimens, have served as the basis for the creation of new species. We refer to our deer-mouse, the notice given by Prof. Peck in the American Philosophical Transactions, Vol. 4, p. 124. The *G. megalops*, *leonurus* and *soricinus*, of a grossly inaccurate and unscrupulous foreign writer in the American Monthly Magazine, p. 446, we consider as mere varieties. A careful and extended comparison of many specimens from various districts will be requisite, before we are enabled to pronounce with certainty upon the existence of more than one species.

The Deer-mouse forms its nest under heaps of stone, or piles of rails, and occasionally, but not often, in stacks of wheat, rye or maize. It brings forth four young, in August. It was called by the Mohegans of this State, *Wah-peh-sous*, or the "animal jumping like a deer." In fact, its leaps of ten to twelve feet at a time are truly remarkable, and have occasioned it to be called the *Jumping Mouse*. In these leaps, it is of course aided by its long tail. We have kept them for some time, when they evinced a timid but gentle disposition,

sleeping during the day, and exceedingly active during the night. They are said to burrow, but their nails appear scarcely fitted for this office; we should rather think that they take possession of vacant burrows, or accidental cavities. They have often been noticed in ploughed grass lands, where the sods of the furrows, by lapping over each other, form long and convenient cavities, in which they make their nests. Mr. Jesse Booth, of Orange county, writes to me, that "in cross-ploughing some years since, my attention was taken up by see-" ing some small thing move off from near my plough, at about the moderate walk of a man. " It went over ridges and descended the hollows of the furrows, bearing some resemblance to " an old withered oak leaf. I pursued it, when it proved to be one of these *wood-mice*, or " *jumping mice;* a female, with four young ones attached by their mouths to its teats." The same gentleman informs me, that "although abundant in his neighborhood, they do very " little damage in the grain fields. They are never seen in the clear daylight, unless dis-" turbed. I once saw two of them," he adds "between sunset and dark, jumping up in " rapid succession, and making a chirping noise like sparrows."

It feeds on the roots of grass, grain, seeds, etc.; but its injuries to man must be inconsiderable. If we are right in supposing all the descriptions as applicable to one species, our Deer-mouse has a considerable geographical range, extending from 62° north to 40°. It has been noticed by Say at the base of the Rocky Mountains.

FAMILY IV. CASTORIDÆ.

Body covered with two sets of hair, a fine soft down and long subrigid hairs. Tail flattened, and covered with rounded or hexagonal scales. Hind feet longest. Ears short. Aquatic. Social. Some species with webbed feet; all with a musky smell, arising from glands near the anus.

GENUS CASTOR. *Linneus.*

Tail broad, oval, flattened horizontally. Molars sixteen. Toes of the hind feet completely webbed. Teats four.

THE BEAVER.

CASTOR FIBER.

PLATE XX. FIG. 1. — PLATE VIII. FIG. 1, A & B. SKULL.

Castor fiber. LIN. 12 Ed. p. 78.
Pond Dog. JOSSELYN, Voyages, p. 92.
Beaver Castor. PENN. Arct. Zool. Vol. 1, p. 98.
C. fiber. Long's Exped. Vol. 1, p. 46. HARLAN, Fauna, p. 122. GODMAN, Am. Nat. Hist. Vol. 1, p. 105, figure.
C. (fiber) americanus. RICHARDSON, F. B. A. Vol. 1, p. 105.
The Beaver. EMMONS, Mass. Report, 1840, p. 51.

Characteristics. Bay or yellowish brown. Length two to three feet. Tail scaly, naked, oval.

Description. Body thick and clumsy, enlarging gradually from the head backwards. Head broad and conical, flattened above. Nose large and obtuse, divided, furnished with strong whiskers. Eyes small and black. Ears short, rounded, and almost concealed in the fur. Neck short and thick. Fore feet small and short, with separate toes; the five claws stout and compressed, the central one longest, the outer and inner shortest. Hind feet with elongated soles; the toes connected throughout their whole length by a stout membrane. Tail broad, flattened, rather pointed at the end, and (except at its origin, where it is furnished for some distance with short hair,) it is covered with sub-hexagonal scales, not imbricated, with a few scattering hairs in the interstices. Incisors very robust, smooth, flat and yellowish in front, rounded and white behind. Molars above directed backward and outward; of the lower jaw, forward and inward. The surfaces of the molars represent elliptical and irregular figures, caused by the foldings of the enamel; they are almost impossible to describe except by figures, and must change with age and continued trituration. The fur consists of two sorts; one composed of long, stiff and elastic hairs, the other of a fine soft down. Glandular sacs containing castoreum, or a strong musky grease or unctuous substance, near the anus.

Color. The long and coarse hair chesnut brown; the downy fur beneath, light plumbeous or silver grey. There are occasional varieties, entirely black, or wholly black or mottled.

Length of head and body, ...	24·0 – 36·0.
Ditto of tail, ...	8·0 – 12·0.

The Beaver, whose skins once formed so important an article of commerce to this State, as to have been incorporated in the armorial bearings of the old Colony, is now nearly extirpated within its limits. The skins of this animal even constituted a certain standard of value, and were a portion of the circulating medium. Thus, in 1697, we find that Governor Fletcher made a certain grant of a tract of land on the Mohawk, and the consideration named in the deed was one beaver skin for the first year, and five annually forever after. According to a letter from the Dutch West India Company, preserved in the Albany Records, we learn, that in 1624, 400 beaver and 700 otter skins were exported; the number increased in 1635, to 14,891 beaver and 1,413 otter skins; and the whole number in the ten years was 80,183 beavers and 7,347 otters, amounting in value to 725,117 guilders. In the same letter, the directors complain that beavers have become exceedingly scarce; having been sold at seven guilders a piece, and even more. One of the earliest legislative enactments by the rulers of the Colony, was in reference to the peltry trade; and I notice in the same records alluded to above, that William De Kay, the ancestor of the writer, was appointed receiver of the duties on beaver and bear skins.

I am informed by Mr. T. O. Fowler, that in 1815, a party of St. Regis Indians from Canada ascended the Oswegatchie river in the county of St. Lawrence, in pursuit of beaver. In consequence of the previous hostilities between this country and England, this district had not been hunted for some years, and the beaver had consequently been undisturbed. The party, after an absence of a few weeks, returned with three hundred beaver skins. These were seen by my informant, who adds that since that time very few have been observed.

In the summer of 1840, we traversed those almost interminable forests on the highlands separating the sources of the Hudson and the St. Lawrence, and included in Hamilton, Herkimer and a part of Essex counties. In the course of our journey we saw several *beaver signs*, as they are termed by the hunters. The Beaver has been so much harassed in this State, that it has ceased making dams, and contents itself with making large excavations in the banks of streams. Within the past year, (1841,) they have been seen on Indian and Cedar rivers, and at Paskungameh or Tupper's lake; and although they are not numerous, yet they are still found in scattered families in the northern part of Hamilton, the southern part of St. Lawrence and the western part of Essex counties. Through the considerate attention of Mr. A. McIntyre, those yet existing in the southern part of Franklin county are carefully preserved from the avidity of the hunter, and there probably the last of the species in the Atlantic States will be found. We noticed the remains of an old and large beaver dam at the outlet of Lake Fourth in Herkimer county, but it is now nearly covered up by the drift sand from the lake.

The Beaver exercises great ingenuity in the construction of its dwelling; but this ingenuity has been much exaggerated, and perhaps no animal has served for the foundation of so many fables. The instinct of self-preservation is doubtless very strong, and its sagacity is such, that were it not for the *signs* near its abode made evident by the stout twigs and trees gnawed and cut down, it would never be discovered. Whenever these chips are noted, the wary hunter proceeds to examine the bank, in order to detect at what particular spot the beaver takes to the water. The castor bags of the beaver, or *barkstone*, as it is termed by the hunters, is then rubbed on twigs near the spot, and a common steel trap is so placed under the water as to spring when the animal dives against it.

The Beaver is strictly a nocturnal animal, and is exceedingly active in its movements. It advances on land by a series of successive leaps of ten or twelve feet, in which it is powerfully assisted by its tail, which it brings down with a resounding noise. It brings forth from two to four at a birth. It feeds chiefly upon the roots of aquatic plants, and the bark of soft-wooded trees, such as the birch, poplar, willow and alder. We have been assured by hunters that they also feed on fish; and for this, their aquatic abodes and habits would appear well adapted. It may be, that in the selection of their dwellings, they design to protect themselves against carnivorous animals.

The geographical range of the Beaver, now so much restricted, once extended from the sixty-eighth to the thirtieth parallel. In the United States, its southern boundary does not extend beyond the districts already mentioned in the State of New-York.

It has been attempted to separate the Beaver of Europe and America into two species. We coincide entirely with Cuvier, who made the most scrupulous comparisons, and was unable to ascertain the existence of any specific differences.

(*EXTRA-LIMITAL.*)

(FOSSIL.)

PLATE XIX. FIG. 3, A, B.

C. (*Trogontherium?*) *ohioense.* This species, which belonged to an animal nearly six feet in length, is founded on the lower jaw of the right side, found near Nashport, Licking county, Ohio, and now in the Zanesville Atheneum. From a cast in the Cabinet of the Lyceum, we are enabled to give the following dimensions: Length, in a straight line, from the posterior part of the lower jaw to the tip of the incisor, 9·5; length of the denuded incisor, following its curve, 9·5; of its bevelled tip, 1·6; breadth of the same, 0·6; breadth of molars, 0·5. The incisor is traversed through its whole length on its anterior and exterior surface, by deep parallel longitudinal grooves. The molars are nearly equal, the penultimate smallest. In some respects, it appears allied to Hystrix. It is, as far as we know, the first instance of the discovery of a fossil of this order in America, and is certainly one of the largest known. In the loose strata near the Sea of Azof in the neighborhood of Taganrok, a skull has been found, which was at first attributed to the Beaver, and which bears a strong resemblance to our specimen. Mr. Fischer has described it as the type of a new genus, which he calls *Trogontherium*, but I have not been able to find his description. For further particulars in relation to the Ohio specimen, see the American Journal, Vol. 31, p. 80, (figure.)

GENUS FIBER. *Illiger.*

Tail long, narrow, pointed and vertically compressed. Molars twelve, the crowns exhibiting sections of triangular prisms. Toes of the hind feet partially webbed. Teats six.

THE MUSQUASH.

FIBER ZIBETHICUS.

PLATE XX. FIG. 2.—PLATE XXXII. FIG. 3. SKULL.—(STATE COLLECTION.)

Castor zibethicus. LINN. 12 Ed. p. 79.
Musk Beaver. PENN. Arct. Zool. Vol. 1, p. 106.
Fiber zibethicus. HARLAN, Faun. p. 132. GODMAN, Am. Nat. Hist. Vol. 2, p. 58, figure. RICHARDSON, F. B. A. Vol. 1, p. 115.
Muskrat. EMMONS, Mass. Report, 1840, p. 54.

Characteristics. Dark brown above, tinged with reddish; greyish beneath. Length eighteen to twenty inches.

Description. Body robust and thickset. Head short, somewhat arched above. Muzzle short and obtuse, with rigid whiskers on each side. Eyes small and black. Ears low, rounded, broader than high, covered with hair, and nearly concealed in the fur. Neck short and indistinct. Fore feet short, with five claws, and covered with short glossy hairs to the bases of the nails, which are short, compressed and slightly curved; the thumb distinct, and furnished

with a long nail. Hind feet long, the soles margined with long whitish hairs; inner and outer toes shortest, subequal; the three others much longer, and the two middle ones united by a short web. Claws moderate, slightly convex, and channelled beneath; a row of stout and coarse bristles on the edges of the toes. Tail vertically compressed, thin on the edges, slightly wider beyond the middle, tapering gradually to its acute tip; its surface is covered with small rounded scales, not concealed by the sparse white hairs. The fur consists of a fine dense down, resembling that of the beaver, but not so fine; this is intermixed with longer subrigid hairs. Upper incisors large, yellowish, slightly rounded, and without grooves; the lower rounded, longer and more pointed. The molars resemble in their structure those of the succeeding family, but have distinct roots.

Color. Dark brown above, intermixed with reddish on the sides of neck and body. Chin, throat and posterior parts of the abdomen greyish or dark ash. Edges of the tail darker than the rest. Occasional varieties are found entirely black, wholly white, or varied with black and white.

Total length,	18·0 – 20·0.
Tail alone,	7·0 – 10·0.

The Musquash or Muskrat is so called from its strong musky odor, which is secreted from glands near the anus. It is a well-known inhabitant of our swamps and low grounds, and generally in every place in the vicinity of water. Although it establishes its abode often in the vicinity of man, its watchfulness is so great that it often escapes his snares. As might be inferred from its structure, its movements on land are awkward and slow, but it swims and dives with great ease in the water. It is a nocturnal animal, feeding on the roots of aquatic plants, and is said to be particularly fond of the calamus root (*C. acorus*). It is also extremely fond of the fresh-water muscle (*Unio*), heaps of which, in a gnawed and comminuted state, may be found near their retreats. They form extensive holes or burrows in banks, and sometimes build small conical hillocks, in which they live and rear their young. The injuries which they occasion to artificial embankments by their burrows, which gradually render them pervious to water, are well known.

The geographical range of the Musquash is very extensive, being found from 30° to 69° north latitude. From some causes with which we are unacquainted, the Musquash, according to Bartram, is not seen in the alluvial of Carolina and Georgia, although it occurs much further south at a distance from the coast. In this State the skins sell for twenty-five cents apiece, and are extensively used in the fabrication of hats.

FAMILY V. HYSTRICIDÆ.

Clavicles rudimentary or none. Body armed with rigid sharp spines, intermixed with hair. Molars sixteen; their summits flat, with ridges of enamel. Tail various, sometimes armed with spines. Tongue with spiny scales.

Obs. This group, which is founded on the old genus Hystrix, comprises five genera, founded on the predominance of hair or spines, and the shape and armature of the tail.

GENUS HYSTRIX. *Linneus.*

Head robust, short, with an obtuse snout and cleft upper lip. Ears short and rounded. Eyes small. Anterior feet with four toes, posterior with five, all armed with robust curved claws. Spines nearly concealed in the hair. Tail prehensile.

THE NORTH AMERICAN PORCUPINE.

Hystrix hudsonius.

PLATE XXVI. FIG. 1.—PLATE VIII. FIG. 2, a, b, c. Teeth and Skull.

Hystrix hudsonius. Brisson, Regnum Animale, p. 128.
H. dorsata. Lin. 12 Ed. p. 57.
Canada Porcupine. Penn. Arct. Zool. Vol. 1, p. 109.
H. dorsata. Erxleben, p. 345.
H. cristata. Loskiel, p. 84.
Canada Porcupine. Sabine, Franklin's Journey, p. 664.
Erethizon dorsatum. F. Cuv. Mem. Mus. Vol. 9, p. 413.
Canada Porcupine. Cozzens, Ann. Lyc. Nat. Hist. New-York, Vol. 1, p. 190. Godman, Am. Nat. Hist. Vol. 2, p. 150, figure.
Hystrix pilosus. Richardson, F. B. A. Vol. 1, p. 214. Doughty, Cab. Nat. Hist. Vol. 1, p. 241, pl. 21. Griffith, Règne Animal of Cuvier, Vol. 3, p. 206, figure.
Porcupine. Emmons, Mass. Report, 1840, p. 71.

Characteristics. Varying from dull brown to black. Tail moderate, thick, prehensile. Length two to three feet.

Description. Body robust, thickset, with its dorsal outline arched. Head moderate, conic, with the nose truncated, broad, and flattened above. Ears short and rounded, almost entirely hidden in the fur. Eyes small and black. Legs very short, with oval palms on the fore feet; four very short toes, armed with long, curved, compressed, blackish claws, grooved beneath, the outer somewhat the smaller. Hind feet with five subequal claws. Fur long and coarse, especially on the back, sides and posterior parts. The great and striking peculiarity of this animal consists in the quills or spines, which are intermixed with the hair, capable of being erected at the will of the animal, and are so loosely adherent as to be detached upon the slightest touch. These are cylindrical, tapering at both ends to an acute point. They vary

in length from half an inch to three inches, and are white with black tips, or entirely white. When examined with a lens, they are found to be covered with minute barbs, imbricated, and pointed towards the base. On the crown of the head and neck, these are short, thick and numerous; on the shoulders and anterior part of the back, they are few, slender and flexible; on the posterior part of the back, and on the thighs, they are very long, strong and numerous. The upper part of the tail is also furnished with smaller spines. The young have long white hairs in place of spines.

Teeth. In the upper jaw, the incisors are very strong, flattened in front abruptly, and bevelled behind; the portion within the sockets three-sided, nearly two inches long, describing the segment of a circle nearly two inches in diameter; the bottom of the socket reaches beneath the socket of the posterior molar. The first, third and fourth molars nearly equal, the second smallest. The anterior molar with three large and irregular diverging prongs, of which the internal is broad and largest; the crown with five cavities separated by waving plates of enamel, the posterior exterior cavity smallest, oval. The second molar small, with four cavities on the crown, resembling in shape the two posterior molars; but the internal oblique cavity becomes gradually effaced in the posterior molar, by the absence or rather subsidence of the internal wall. The fangs of this second molar are also three in number, with a tendency in the two outer to become double; in the two last, the prongs are increased to three. In the lower jaw, the incisors are 2·7 long, and reach beneath the root of the posterior molars; they project farther from the jaw than those of the upper jaw, and describe an arc of a larger circle; the bevelled portion is also much longer. The molars are similar in size and configuration above, except the second, which is smaller. They have all four cavities, three of which are regularly bounded by plates of enamel, and the external cavity deficient on its outer margin. The anterior molar with three prongs, of which the anterior is largest; the whole periphery of the crowns surrounded by a plate of enamel, including the plates which bound each cavity. With age, the whole surface is ground down, leaving no vestige of cavity. The molars of the upper jaw incline outwards; of the lower, inwards.

Color. Usually dark brown, intermixed with black; the females are said to be of a darker brown. They are often hoary, and occasionally entirely white. The tail is brown above and beneath, with a few whitish hairs along its margin and at its tip.

Length of head and body,	24·0.
Ditto of the tail,	6·0.
Ditto of the skull,	4·0.

The Porcupine is an inoffensive animal, and very gentle in its manners. It feeds on the leaves and bark of the hemlock (Pinus canadensis), the basswood (Tibia glabra), and the ash (Fraxinus sambucifolia). It is also fond of sweet apples, maize, and will scarcely refuse any vegetable offered to them in confinement. They move very sluggishly, dragging their tail on the ground. When irritated, they make a faint whining noise, and by a strong cuticular muscle the spines of the back and sides are erected and extended in various directions; the tail

is also erected, and by a very sudden movement he is enabled to strike, leaving the loosened spines in the body of his opponent. From their peculiar structure, they penetrate at every movement until they reach a vital part. Hence it is rarely attacked, although the hunters easily kill it by a blow on its nose. The Indians esteem its flesh, which resembles young pork very highly. It dwells in hollow trees, or in caves under rocks, and is said to bring forth two at a litter in April or May. The spines are employed extensively by the Indians, after having been dyed of various colors, to form ornaments for their dresses.

The Porcupine is found as far north as 67°. It is found in all the Northern States; in New-York, Pennsylvania, the northern parts of Virginia, Kentucky, and through the western regions to the Rocky Mountains. In this State, more particularly in the northern and western counties, they are quite numerous. The first name given in accordance with the binary system, is that proposed by Brisson, and by the law of priority it must be restored.

FAMILY VI. MURIDÆ.

Clavicles robust, and fully developed. Fur not uniformly soft, but without spines or rigid hairs. Molars usually six above and six beneath, but various. Some of the genera are provided with cheek pouches. Tail cylindrical, usually naked or sparsely haired, of various lengths. Mostly composed of small burrowing animals.

This family comprises numerous species, which are confessedly difficult to group together by common characters. They may, however, be divided into two great sections, characterised by the presence or absence of cheek pouches. Under those with cheek pouches, we arrange the genera *Geomys* and *Diplostoma*. The other division embraces the genera *Mus, Arvicola, Sigmodon, Neotoma, Georychus*, and *Aplodontia*. The field for discovery in this family is still far from being exhausted. The representatives of only three genera are found in this State.

GENUS MUS. *Linneus.*

Molars six above and six beneath, with tuberculous summits. Tail scaly, nearly naked, longer or nearly as long as the body. Ears usually naked or slightly furred.

Obs. Three of the species have been introduced.

THE BROWN RAT.—(*Introduced.*)

MUS DECUMANUS.

Mus decumanus. PALLAS.
Brown Rat. PENN. Arct. Zool. Vol. 1, p. 130.
Common Brown or *Norway Rat.* GODMAN, Am. Nat. Hist. Vol. 2, p. 78.
Brown Rat. RICHARDSON, F. B. A. Vol. 1, p. 141. EMMONS, Mass. Report, 1840, p. 63

Characteristics. Grayish brown above, tinged with yellow; beneath whitish. Tail not quite as long as the body, and with 180 rings. Length 19 – 20 inches.

Description. Body robust. Ears rounded, as broad as long, and nearly naked. Eyes black, large and prominent. Tail naked and scaly, with a short hair under each ring; it is sometimes as long as the body, but usually shorter.

Color. Hair dusky ash at the roots, yellowish with a reddish tinge at the tips, intermixed with longer hairs of a uniform brown, from which results a yellowish gray brown color above. Beneath, soiled white, inclining to cinereous. Feet pale flesh-color.

Length of head,	2·5.
Ditto of body,	9·0.
Ditto of tail,	8·5.

This well known and dreaded pest of our dwellings came originally from Asia. It appeared in Europe about the beginning of the seventeenth century. It is believed to have been imported into England with its Hanoverian race of kings. In this country, it was introduced with the foreign mercenaries during the revolutionary war. They are now numerous in all the States, and have extended to Canada. It takes to the water, and swims with great ease. In cities it infests the wharves, and hence is frequently known as the *Dock Rat.* The name *decumanus*, we apprehend, was not given on account of its size (*decimanus*), but from *decumanus*, in allusion to the tithe of every thing taken by this voracious animal. (See *Cicero contra Verres.*)

The Rat is a bold, voracious and cunning animal, and appears to be as fond of flesh as of vegetables. It brings forth twelve to sixteen at a litter. The best mode of destroying them is said to be, mixing plaster of paris largely with dry flour; this will harden in the stomach, and destroy them in a short time. Another mode is to mix powdered nux vomica with indian meal, and add a few drops of oil of rhodium to the mixture. Arsenic is frequently employed, but is objectionable on account of the fatal accidents to which it frequently gives rise.

THE BLACK RAT.—(*Introduced.*)

Mus rattus.

Mus rattus. Linn. 12 Ed. p. 83.

Black Rat. Pennant, Arct. Zoology, Vol. 1, p. 129. Harlan, Fauna Americana, p. 148. Godman, Am. Nat. Hist. Vol. 2, p. 83. Richardson, F. B. A. Vol. 1, p. 140. Emmons, Mass. Report, 1840, p. 63.

Characteristics. Greyish black above; ash-colored beneath. Tail somewhat longer than the body. Length 15 – 16 inches.

Description. Head long; muzzle more acute than in the preceding species; lower jaw very short. Ears oval, broad and naked, nearly half as long as the head. Whiskers long. Fore feet with four toes, and a claw in place of thumb. Tail longer than the body, and covered with scales in the form of rings. Feet plantigrade. Mammæ twelve.

Color. Deep iron-grey or greyish black above; lighter beneath, usually cinereous. Feet and tail dusky, with white hairs covering the tops of the feet.

Length of the head,	1·5.
Ditto of body,	5·5.
Ditto of tail,	7·9.

This animal is also supposed to have originally been derived from Europe, and thence transmitted to America. It is smaller than the preceding, and is generally thought to have disappeared before it; at any rate, it is now exceedingly rare. It is said to breed several times in the year, producing from six to twelve at a litter. Like the preceding, it is omnivorous.

THE AMERICAN BLACK RAT.

MUS AMERICANUS.

PLATE XXI. FIG. 1.—(COLLECTION OF J. G. BELL.)

Characteristics. Black above, leaden beneath. Ears higher than broad. Tail shorter than the body. Length 15 inches.

Description. Ears large, dilated and rounded, almost entirely naked, sparsely furnished with short hairs. Whiskers black, numerous, extending to the hind head. Fore feet feeble, with five tubercles on the soles. Claws horn-colored, small, acute, incurved; the toe next to the internal longest. Hind feet with four tubercles arranged quadrilaterally; toes longer and more robust than on the fore feet; claws stouter, and not so much incurved. Muzzle bifid. Nostrils lateral. Tail cylindrical, tapering regularly to the tip: the annulations about a hundred and forty, covered sparsely with short hairs, which extend 0·2 beyond the tip.

Teeth. In the lower jaw, the incisors are longer than those above. The molars gradually diminish in size; the first largest, with two cavities; the anterior trilobate in front, and separated by a waved transverse ridge from the adjacent tooth; the second with two smaller cavities, separated in the same manner. The posterior tooth smallest, with two cavities, the ultimate space rounded.

Color. Above uniformly black, the fur at the base slightly fulvous; beneath, of a uniformly leaden hue. Incisors yellowish. Fore toes whitish, with a rufous tinge on the inside.

Length of head,	2·4.	Height of ear,	0·75.
Ditto of body,	7·0.	Width of ditto,	0·45.
Ditto of tail,	6·0.	Girth of body at shoulders,	7·00.

We cite no synonimes, as we believe the species to have been either unobserved, or confounded with the imported Black Rat of Europe. It is very rare. The only specimen I have ever seen was brought to me in a recent state by Mr. John Bell, when the fur was distinctly black. After having been mounted for several months, the fur assumed a more brownish hue. It appears to differ from the *decumanus* in its teeth, the number of its annulations, position of the mouth, and proportion of its ears; from the *rattus*, in its dentition, relative length of ears, and tail.

THE COMMON MOUSE.

MUS MUSCULUS.

Mus musculus. LIN. 12 Ed. p. 83.
Mouse. PENN. Arct. Zool. Vol. 1, p. 131. SAY, Long's Exped. Vol. 1, p. 262. HARLAN, p. 149. GODMAN, Am. Nat. Hist. Vol. 2, p. 84. EMMONS, Mass. Report, 1840, p. 62.

Characteristics. Dusky grey above, with a slight tinge of yellow; beneath ash grey. Ears about half the length of the head. Tail nearly as long as the body.

This familiar little species has also been introduced from Europe into this country, since its discovery. It has every where followed the footsteps of man, and is now extended to our most western settlements. It breeds several times, or what is more probable, at various seasons of the year, bringing forth from six to ten at a litter. It may be treated rather as a troublesome than as an extensively injurious animal. It is omnivorous, and lives equally on flesh and vegetables; apparently, however, preferring the latter.

THE JUMPING MOUSE.

MUS LEUCOPUS.

PLATE XXIII. FIG. 1.—(STATE COLLECTION.)

The Rustic Mouse. GODMAN, Am. Nat. Hist.
Mus leucopus. RICHARDSON, F. B. A. Vol. 1, p. 142.
Arvicola emmonsi. EMMONS, Mass. Report, p. 61.

Characteristics. Brownish above; feet and all beneath white. Ears large. Tail hairy, as long or longer than the body. Length six inches.

Description. Head rather large, with a pointed muzzle. Eyes moderate. Ears large, rounded above, membranous and naked on the upper margin within and without. Whiskers numerous, blackish brown at the base, whitish at the tips, longer than the head. Fore feet four-toed, with five tubercles; the thumb is rudimentary, not furnished with a claw. Hind feet an inch and a half long, with five toes, and with short, feeble and curved claws nearly concealed by long white hairs. Tail slender, hairy, subquadrate, slightly tapering. Incisors not grooved. Molars tuberculated, the first in each jaw largest; they gradually diminish in size to the most posterior, which, when worn, presents a circular disk on the crown, and is scarcely tuberculated. Fur fine and rather long.

Color. Light reddish brown above, intermixed with some entirely black hairs along the back, which gives to that region a much darker appearance. The light reddish fur above is dark slate at the roots; it is separated from the light color beneath by a tolerably well defined, and occasionally a darker line. All beneath, including the feet, the anterior, inner and posterior parts of the thighs, and the inferior and lateral portions of the tail, pure white. This color is plumbeous at the base.

Total length,	6·0.	Length of hind feet,	1·5.
Length of head,	1·0.	Ditto of whiskers,	1·5.
Ditto of body,	2·5.	Ditto of tail,	2·5.
Ditto of fore feet,	0·8.		

This little mouse, from the distribution of its colors, and its slender proportions, has a delicate and beautiful appearance. It is very agile, jumping in the manner of the deer-mouse; and is called, in common with that animal, the *jumping mouse*. It seems to prefer forests and wooded places, but is often found in meadows or cultivated grounds, where grain and seeds of grasses abound. When this mouse was first submitted to me, I referred it to the *M. agrarius* of Godman; but upon consulting the original description, it was plainly evident that it could not be referred to that species, although Godman evidently had the jumping mouse in view when he drew up his description.* I had not at that time the work of Richardson to refer to, and hastily pronouced it to be new, giving it the name of *emmonsi*, after the eminent naturalist who had first brought it to my notice.

The Jumping Mouse is found in every part of the State, and is said to build its nest in trees. In the northern regions, according to Richardson, it becomes an inmate of the dwellings at the fur establishments, and makes hoards of grain in various places, such as the pocket of a coat, a shoe, etc. We have never heard of its entering dwellings in the cultivated portions of our State, but this is probably owing to the presence of the cat, or of rats. It is found from Hudson's Bay to Pennsylvania, and through the Western States to the mouth of Columbia river.

GENUS ARVICOLA. *Lacépède.*

Grinders flat on their crowns, the enamel forming angular ridges on the surface. Ears furry. Tail round and hairy, shorter than the body.

Obs. This genus, which was first separated from *Mus* by Lacépède, comprises many species known under the vague names of Field Mice and Field Rats; all, however, differing from the Mice proper, by the structure of their teeth, and the length and hairy covering of the tail. The species are numerous in the United States, but have not yet been sufficiently observed and discriminated.

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* According to Erxleben, p. 398, the *agrarius* has small ears, a constant black line on the back, the thumb with a nail, tail half the length of the body, etc.

THE MARSH MEADOW-MOUSE.

ARVICOLA RIPARIUS.

PLATE XXII. FIG. 2.—(STATE COLLECTION.)

Arvicola riparius. ORD, Acad. Sc. Philad. Vol. 4, p. 305.
Marsh Campagnol. GODMAN, Am. Nat. Hist. Vol. 2, p. 67.

Characteristics. Glossy, tawny brown above; light plumbeous beneath. Tail less than half the length of the head and body. Length three to three and a half inches.

Description. Body short and robust, more particularly about the shoulders. Head large. Muzzle elongated, truncate at its extremity. Eyes distinct, and 0·3 distant from the end of the muzzle. Mouth beneath, not terminal. Whiskers numerous, white, and 0·6 long. Ears distinct, broad, subacute, and lined within and without with long hairs extending beyond the margins; this, together with the long fur surrounding them, almost conceals them from observation. All the feet very short and slender. Fore feet 0·6 long, and clothed with short adpressed hairs; the claws small, acute, curved, channelled beneath, and dilated at their bases; the thumb rudimentary, and furnished with a short triangular claw; the two middle toes longest, subequal. Hind feet placed very far back, 0·8 long, and clothed with short rigid adpressed hairs, extending to the tips of the nails; the three middle toes subequal. Tail very slender, equal throughout, subquadrate, not flattened, scaly, with short hairs scarcely concealing the scales, and extending about 0·2 beyond the vertebræ; not forming, however, a tuft, as is erroneously given in the plate. Fur rather fine and soft, 0·2 long on the upper part of the body. The nose, jaws and chin furnished with short hair.

Teeth. The upper incisors short, scarcely higher than broad; their flat, chisel-shaped points directed towards each other, and their bases somewhat diverging. The lower incisors slender, 0·13 in length above their sockets, cylindrical, pointed, and directed forwards horizontally. The anterior and posterior molars smallest, and all with zigzag lines of enamel; the middle molar is composed of four flattened prisms.

Color. Above a glossy tawny brown, plumbeous at the base, intermixed with others longer and totally black. Chin and all beneath, leaden grey. Feet dark brown; soles black. Tail deep blackish brown, imperceptibly passing into a shade lighter beneath.

Length of head and body,	2·5.
Ditto of tail,	0·7.
Total length,	3·2.

The *Bank Meadow-mouse* of Richardson, which he refers to the *riparius* of Ord, I cannot think is identical with it. It is much larger, being nine inches in total length, and has white feet and a flattened tail. The very small size of the specimen which I first obtained, and from which the dimensions given above were taken, induced me to suspect that it was new; but later observations on others have satisfied me of its identity with the *riparius*. Mr. Ord gives

the length of the head and body, five inches; of the tail, two inches. He states that the female has four pectoral and four abdominal teats, and brings forth eight young at a litter. It frequents marshy places, living chiefly on the seeds of plants growing in such localities. It burrows in the banks for its retreat, and for rearing its young.

The Marsh Meadow-mouse is not uncommon in various parts of the State. I have seen specimens from Oneida, Seneca and Otsego counties. At present, it is known to extend from Delaware Bay to the forty-third degree of north latitude, and it will probably be found in all the Eastern States.

THE TAWNY MEADOW-MOUSE.

ARVICOLA RUFESCENS.

PLATE XXII. FIG. 1.

Characteristics. Light reddish brown above; slate beneath. Tail longer than the head. Length 6 – 7 inches.

Description. Body robust. Head large, conical, with an arched forehead. Nose bluntly pointed; nostrils bilobate, subterminal, and beset with short, erect and rigid hairs. Mouth beneath, the upper lip fringed with short white incurved hairs, and on the cheeks are long white bristles. Whiskers as long as the head, brownish, and occasionally whitish at the tips. Eyes small and black, nearly equidistant between the ears and muzzle. Ears large, much dilated and rounded, covered with long hairs extending beyond the margins. The fur anterior to the ear is very long; and when the ears lie back, although large, they are nearly concealed in the fur. Fore feet very slender, 0·8 long, with four separated slender toes, and a rudimentary thumb furnished with a small nail. Soles with five tubercles, three arranged in a triangle, and the two others transversely. Claws curved and retracted at their tips; external toe shortest, the second longest, the two middle subequal. Hind feet placed far back, 1·1 in length; the internal toe shortest, almost rudimentary, and the claws more broadly channelled throughout their entire length. Soles with six tubercles, the external very small. Tail very slender, subquadrate, slightly tapering, with sparse rigid hairs scarcely concealing the scales; tip moderately pencilled, not tufted. Fur on the body very soft and glossy, for the most part 0·3 in length; the legs are clothed with short adpressed hair, a few white hairs extending to the tips of the claws. Upper incisors broad, convex anteriorly, with a medial longitudinal furrow, slightly emarginate on their cutting edges; beneath they are more cylindrical, and pointed at their tips. Upper molars with nine external angles; beneath, the first is largest, with a deep lateral sinus.

Color. The fur on the upper part of the head and body is plumbeous at base, light rufous at the tips, intermixed with scattering coarse hairs tipped with black; hence the resulting color is a bright reddish brown. Beneath, bluish white, somewhat more light on the inside of the thighs. Muzzle, and the parts adjacent, of a darkish brown hue. Feet light brown. Tail of a uniform dark brown above, cinereous beneath.

Total length,	5·0.
Length of head and body,	3·0.
Length of tail,	2·0.

It is with hesitation that I venture to consider this animal as new. It will be found to differ from *riparius* by its larger and more arched head, and its dental structure; from *xanthognathus*, to which it bears some resemblance, by its relative dimensions; from *noveboracensis* of Richardson, by the blunt nose and rudimentary thumb; and from *borealis*, by its nearly naked tail, and comparatively shorter fur. It only remains for us to consider it under a new name, at the hazard of swelling the already interminable list of synonimes.

We have little to add, except that it was first obtained from low grounds in the neighborhood of Oneida lake. I subsequently found it in great numbers in the forests of Hamilton and St. Lawrence counties. It was exceedingly active and lively, and frequently seen running along on fallen timber. When disturbed, it retreated to its burrow at the roots of trees. It may be added, that variations in the length of its tail frequently occur. In specimens of the dimensions given above, the tail varied from one and a half to two inches.

THE BEAVER FIELD-MOUSE.

ARVICOLA HIRSUTUS.

PLATE XXV. FIG. 2.—(STATE COLLECTION.)

Meadow-mouse. PENNANT, Arct. Zool. Vol. 1, p. 133.
Arvicola hirsutus. EMMONS, Mass. Report, 1840, p. 60.

Characteristics. Dark brown above, deep ash beneath. Tail less than half the length of the body. Ears membranous, concealed. Length five to five and a half inches.

Description. Body robust, compact, largest across the fore shoulders, sensibly less over the loins. Head pyramidal. Whiskers numerous, scattering, radiated, black and white, some of them extending beyond the eyes. Nose flesh-colored, cleft, and covered to its tip with short rigid hairs; nostrils lateral. Eyes small and black, almost hidden in the fur, and about half an inch from the nose. Ears large, round, membranous, concealed beneath the fur, apparently naked behind, but in fact sparsely furnished with hairs which extend beyond the margins; within naked, except towards the edges; auricular opening large, and presenting a tripartite cavity. Anterior to the ears, the fur is so long, and unites so well with that on the borders of the ears, that although they are in fact quite large, they are not obvious; they are distant about an inch and a half from the extremity of the nose. Tongue smooth and fleshy, with a longitudinal furrow. There is a reduplication of the skin posterior to the upper incisors, which is furnished with hairs. Three transverse furrows anterior to the molars. Fore feet 0·8 long, with four toes, and a thumb furnished with a minute nail; the remaining toes have white, compressed, pointed claws, deeply channelled beneath; the external shortest, the two middle ones subequal, the one nearest the thumb being somewhat longest: all the toes with transverse

scales beneath. Soles with five tubercles. Hind legs 1·2 in length; the internal toe shortest, and the middle toe slightly longer than the adjacent one on each side; near their bases, the nails are slightly tinged with brown: all the toes have transverse scales on the under side. Soles with five distinct tubercles, and another minute one opposite the internal toe. Tail moderate, cylindrical, enlarged at the root, scaly, with rather sparse supine hairs, some of which extend slightly beyond the vertebræ. The whole body covered with an exceedingly long and fine fur, standing half an inch high along the back, and slightly less on other parts of the body. On the legs the hairs are short, adpressed beneath, and extend beyond the nails.

Teeth. These correspond very well with the dentition assigned by Fred. Cuvier to the Campagnols, (Dents des Mammifères, p. 155,) with the following variations: The second molar of the upper jaw is composed of five triangles, the posterior space being the largest, elongated and sinuous. In the lower jaw, the incisors are not as much rounded on their anterior surfaces, are more slender, and twice the length of those above. In the first molar are three internal triangles, of which the posterior is largest; in the second are an anterior, an external, two internal, and a posterior transverse space; the last molar has three irregular spaces, the posterior being the largest, transverse and almost semilunate. All are so closely united, that a casual observer would be led to suppose that there were many more teeth than actually exist. In the broad and dilated processes of the lower jaw, almost concealing the teeth, and in the position and shape of the triangular spaces on the crowns of the teeth, we have a representation in miniature of similar parts in the *Fiber zibethicus* already described.

Color. Above brownish grey, slightly darker on the back, approaching nearly in color to the Brown Rat. This color passes into slaty grey on the chin, cheeks and abdomen; the base of the fur, on every part of the body, dark plumbeous. Feet dark brown above, cinereous beneath. Nose flesh-colored. Tail brownish above, lighter beneath, with a few hairs fulvous at their base.

Length of head and body,	5·0.
Ditto of tail,	1·9.

In another specimen the dimensions were,

Length of head and body,	3·9.
Ditto of tail (vertebræ),	1·4.
Ditto ditto (including fur),	1·6.

This species affords another example of the great difficulty of determining whether it has been previously described. A distinguished American naturalist is disposed to refer it to the *xanthognathus* of Leach, (Zool. Miscell. Vol. 1. pl. 26.) It wants, however, the fulvous cheeks, and the ears well covered with hair, attributed to that species by Richardson. Upon the suggestion that it might possibly be the *pensylvanicus* of Ord and Harlan, it was shown to both those gentlemen, who pronounced it to be totally distinct. We are inclined to believe it to be the Meadow-mouse of Pennant, as cited above. His account, concise as it is, agrees

with our species, except in the very variable and ill-defined character of pencils of hairs on the tail. Richardson appears to doubt whether Pennant was not mistaken in the length of the tail. He quotes Buffon with a doubt, but he also refers to a specimen in the Leverian Museum, from which he probably drew his description. It is very closely allied to the *pensylvanicus* of Ord, as described by Richardson.

The popular name of *Beaver Rat* or *Beaver Mouse*, is derived from the abundance and fineness of its fur. I am unacquainted with its habits, except that it appears to be nocturnal, and quite gentle. It feeds on various grains and shrubs. It is occasionally eaten, and is said to be delicate food. It occurs in various parts of the State, and I have received specimens also from Connecticut.

THE ONEIDA MEADOW-MOUSE.

ARVICOLA ONEIDA.

PLATE XXV. FIG. 1.—(STATE COLLECTION.)

Characteristics. Amber brown above, dark cinereous grey beneath. A triangular thumb claw. Hind feet very long. Length 3 – 4 inches.

Description. Body moderately robust, and covered with a fine soft fur about 0·2 in length. Ears placed very far back, membranous, and nearly hidden in the fur. Eyes moderate and black. Muzzle pointed, bifid, truncated, and covered with short rigid hairs. Nostrils lateral. Whiskers slender, black, not as long as the head; numerous black setæ over the eyes. Upper lip fringed with short, recurved, rigid hairs. Feet very small and slender, not formed for digging, covered with short adpressed hairs; the nails covered with long hairs. Fore feet with four slender, separated toes, furnished with short nails, broad at the base, very acute, compressed and channelled beneath; thumb small, and furnished with a short triangular nail. Hind feet nearly twice the length of the fore feet, the fur concealing more than two-thirds of the tibia; five-toed, the toes somewhat longer, and the nails slightly stouter, but broadly channelled beneath, and not so much incurved as those on the fore feet; inner toe shortest, the three next subequal, the outer longer than the inner toe. Tail slender, subequal throughout, sparsely covered with rigid adpressed hairs; the articulations not concealed, and slightly pencilled at the tip. Upper incisors very short.

Color. Above brown or dark mouse-color, with a slight intermixture of tawny. At the base the fur is dark slate, and on the upper part of the head and body, and on the sides, with tawny tips; mixed with these are longer and uniformly black hairs. Incisors yellow. Muzzle and chin ashen gray. Beneath, the fur is light slate at the base, grey at the tips, from whence results a general light blue grey beneath. Feet with short, stiff, uniform brownish black hairs. Nails light horn marked with brown.

Total length,	4·5.	Length of fore legs,	0·4.
Length of tail,	1·3.	Ditto of hind legs,	0·7.
Ditto of head and body,	3·2.		

This species is common in the western part of the State. My specimens were obtained from the neighborhood of Oneida lake. It appears to prefer moist places.

THE LIGHT-COLORED MEADOW-MOUSE.

ARVICOLA ALBO-RUFESCENS.

PLATE XXIV. FIG. 1.—(COLLECTION OF PROF. EMMONS.)

Arvicola albo-rufescens. EMMONS, Mass. Report, 1840, p. 60.

Characteristics. Light yellowish above, lighter beneath. Length five inches.

Description. Body compact. Head conical, moderate, with a slightly convex outline. Muzzle prominent, and furnished on each side with two series of light brownish bristles, extending as far back as the ears. Eyes small and black. Nostrils lateral, with a dividing furrow. Ears membranous, large and rounded, with hairy margins and a broad auditory opening. Fore feet feeble, and clothed with short subrigid hairs extending to the tips of the nails, with a thumb tubercle, furnished with a rudimentary nail. All the nails nearly straight, slightly incurved. Hind feet longer, and clothed in the same manner with short hairs; five-clawed, the three medial subequal. Tail slender, scaly, sparsely covered with rigid hairs, a few of them extending 0·15 beyond the tips. In cabinet specimens, the desiccation of the tail gives it a somewhat nodulous appearance. Upper incisors short, yellow, and convex in front; lower incisors long and rounded. Upper molars broad and angular in front, narrow and more rounded behind. In the lower jaw, the anterior molar is composed of six plates of enamel; the middle, of four; and the posterior, which is smallest, of three plates.

Color. All the upper part of the head and body, and the sides, drab, with a tinge of reddish; beneath greyish, with a tinge of sulphur yellow. All the fur white at base. Feet and tail brownish, the latter cinereous beneath.

Length of head and body, . 3·08.	Length of fore legs, ... 0·6.
Ditto of tail (vertebræ), ... 1·03.	Ditto of hind legs, ... 1·0.
Ditto of ears, ... 0·25.	

For an opportunity of examining this animal, I am indebted to Prof. Emmons, who obtained it on its form or nest, with another of the same shape and color. The color of its eyes renders it probable that it was not an albino. It appears to be very rare.

THE YELLOW-CHEEKED MEADOW-MOUSE.

ARVICOLA XANTHOGNATHUS.

PLATE XXIII. FIG. 2.—(STATE COLLECTION.)

Arvicola xanthognathus. LEACH, Zool. Miscell. Vol. 1, p. 60, pl. 26.
Campagnol aux joues fauves. DESM. Mammalogie, p. 282.
The Meadow-mouse. GODMAN, Am. Nat. Hist. Vol. 2, p. 65.
Yellow-cheeked Meadow-mouse. RICH. F. B. A. Vol. 1, p. 122.

Characteristics. Reddish brown above, greyish beneath; cheeks fulvous. Tail not as long as the head. Length 8 to 10 inches.

Description. Body robust, cylindrical. Ears half an inch high in the largest individuals, rounded, sparsely hairy within, well furred externally. Whiskers numerous, longer than the head. Muzzle somewhat blunt. Fore legs covered with short adpressed hairs, a few extending beyond the nails; four toes, and a vestige of thumb with a nail; the other nails are slightly curved and feeble. Hind feet five-toed, the three middle subequal. Tail slender, slightly less at the tip, covered with numerous adpressed hairs, concealing the scales, and forming a point 0·2 beyond the tip. Incisors above short, rounded in front. In the upper jaw the posterior molar largest; below, the largest is the anterior molar. Fur long and soft.

Color. Above, reddish brown, intermixed with uniformly black hairs; beneath, bluish ash. Sides of the cheeks reddish, more or less distinct. Upper part of the feet and tail dark reddish brown, ashen grey or whitish beneath.

Length of head and body,	7·0.
Ditto of tail,	1·3.

This Meadow-mouse is found in various parts of the State. It varies much in size; and Godman, who assigns five inches for its length, probably described from a young individual. It burrows in banks, and produces seven or eight at a litter. Its geographical range is extensive. It occurs in the Western States, and extends to the Arctic regions.

(*EXTRA-LIMITAL.*)

A. pensylvanicus, Ord. (RICHARDSON, p. 124. WILSON, Orn. Vol. 6, pl. 50.) Brown above, beneath nearly white; snout obtuse. A blunt hairy tail, half the length of the body. Length 4–5 inches.

A. borealis. (RICHARDSON, Zool. Mag. 1828.) Above chesnut mixed with black, grey beneath; a strong thumb nail; ears concealed in the head. Tail as long as the head. Length 5½ inches. *Arctic Regions.*

A. noveboracensis. (RICHARDSON, p. 126.) Above dark brown, beneath dark grey; nose acute, slender; ears slightly beyond the fur. Tail scaly, sparsely hairy, more than half the length of the head. Length 6 inches. *Rocky Mountains.*

A. nuttalii. (HARLAN, Med. and Phys. Res. p. 55, plate.) Fawn color above, white beneath; ears large and hairy. Tail nearly as long as the body. Length 5½ inches. *Virginia.*

A. pinetorum. (LE CONTE, Ann. Lyc. Vol. 3, p. 132, plate.) Dark ash, tipped with brown; ears short, naked, concealed; thumb with a straight nail. Tail round, 0·7 long. Length 3 to 4 inches. *Georgia.*

A. gapperi. (Zool. Journ. Vol. 5, p. 202.) Tail more than half the length of the body; ears short, rounded, chesnut above; face and sides yellowish brown; belly yellowish white; chin and throat ashen. Tail nearly two inches. Length six. *An neoboracensis?*

A. ferrugineus. (HARLAN, Med. and Phys. p. 57.) Rust-colored above, white beneath; fore legs short. Tail more than half the length of the body. Length 11 inches. *Mississippi.*

A. richardsoni, (*riparius* of Richardson, p. 120.) Dull brown mixed with black, bluish grey beneath; ears moderate, nearly concealed. Tail flat, as long as the head; feet white. Length 9 inches. *Arctic Regions.*

A. rubricatus. (Beechey's Appendix.) With a bright red stripe on the flanks. *Behring's Straits.*

Genus NEOTOMA, *Say* and *Ord.* Molars with large roots; the folds of the enamel not descending as low as the edge of the alveolar processes. Its other characters similar to the genus Arvicola.

N. floridanum. (Ac. Sc. Vol. 4, p. 345, pl. 21.) Plumbeous above, yellowish on the sides; eyes and ears very large. Tail longer than the body. Length 14 inches. *Florida.*

N. drummondi. (RICHARDSON, pl. 7.) Yellowish brown above, white beneath. Tail more bushy towards the extremity, longer than the body. Length 16 inches. *Rocky Mountains.*

Genus SIGMODON, *Say.* Molars subequal, with roots; the folds of the enamel representing the letter S.

S. hortense. (HARLAN, Med. and Phys. pl. Ac. Sc. Vol. 4, pl. 22.) Soiled yellow or blackish above, beneath cinereous; ears large and round. Tail nearly as long as the body. Length 10 inches. *Florida.*

Genus GEORYCHUS, *Illiger.* Eyes very small; ears rising slightly above the auditory hole; thumb obvious; toes of the fore feet formed for digging. Tail very short.

G. helvolus. (RICHARDSON, p. 128.) Head black and tawny; body reddish orange, paler beneath. Length 5 inches. *Northern Regions.*

G. trimucronatus. (RICHARDSON, p. 130.) Chesnut above; thumb nail with three projecting points. Length 5½ inches. *Arctic Regions.*

G. hudsonius. (ID. p. 132.) Dark brown above, bright rusty on the sides; the two middle nails of fore feet very large, with a deep notch on the ends; earless. Length 6 inches. *Labrador and Arctic Regions.*

G. grænlandicus. (ID. p. 134.) Earless; a dark dorsal stripe; nails of the fore feet terminating in sharp cylindrical points. Length 7 inches. *Arctic Regions.*

Genus APLODONTIA, *Richardson.* Molars ten above, eight beneath; ears short and round; feet five-toed; nails large, strong and compressed. Tail minute, concealed by the fur.

A. leporina. (RICHARDSON, p. 211, pl. 18.) Umber brown above, greyish beneath; legs short; throat with a white spot. Tail ½ an inch. Length 14 inches. *Northern Regions, Missouri.*

** WITH CHEEK POUCHES.

Genus GEOMYS, *Richardson.* Eyes small and far apart; auditory hole small, with a slightly raised margin; molars ten above, ten beneath; cheek pouches large and pendulous, opening into the mouth by the side of the molar teeth. Burrowing.

G. douglasi. (RICHARDSON, pl. 18.) Dusky brown above, paler beneath. Tail more than half the length of the body. Length nine inches. *Columbia River.*

G. umbrinus. (ID. p. 202.) Umber brown above, grey beneath; throat and feet white. Tail grey, hairy, as long as the head. Length 9 inches. *Louisiana.*

G. talpoides. (ID. p. 204.) Greyish black; chin, throat and tail white; hind feet with but four complete toes. Length nine inches. *Hudson's Bay.*

G. bulbivorus. (ID. pl. 18, B.) Mouth vertical; a wide pouch on each side, not communicating with the cavity of the mouth. Length 14 inches. *Columbia River.*

G. bursarius. (SAY, Long's Exped. Vol. 1, p. 406. SHAW, pl. 138.) Reddish brown or greyish; upper incisors with a deep groove in the middle. Length 9 to 12 inches. *Upper Lakes, Missouri, Florida.*

G. borealis. (BACHMAN, Ac. Sc. Vol. 8, p. 103.) Pale grey; beneath with feet and tail, white; upper incisors scarcely grooved; ears distinct, not concealed. Length 9½ inches. *Columbia River.*

G. townsendi. (ID. ib. Vol. 8, p. 105.) Colored as in the preceding; chin pure white; closely allied to the preceding. Length 10 inches. *Columbia River.*

FAMILY VII. LEPORIDÆ.

Body covered with hair alone. Clavicles rudimentary. Ears long and erect. Eyes large and prominent. Head long, narrow and compressed. Four upper incisors, (in the young six.) Anterior feet with five toes, posterior with four. Tail short, or none. Timid, saving itself by rapid flight.

GENUS LEPUS. *Linnæus.*

Incisors above, four; the two in front large, and grooved; the two behind, small. Molars twelve above, ten beneath, cylindrical, compressed, and composed of two vertical soldered folds of enamel. Interior of the mouth, and the soles of the feet, furnished with hair. Tail short and upturned. Hind legs very long. Mammæ six to ten in number. A fold of skin in each groin, forming a sort of pouch.

THE AMERICAN GREY RABBIT.

LEPUS NANUS.

PLATE XXVII. FIG. 1. — (STATE COLLECTION.)

Lepus nanus. SCHREBER, Sauge. Vol. 2, p. 881, pl. 234, fig. B.
Rabbit. WILLIAMS, Nat. and Civil Hist. Vermont, p. 91. BELKNAP, Hist. N. Hampshire, Vol. 3, p. 113.
L. americanus. DESMAREST, Mam. p. 351. HARLAN, Faun. p. 93. GODMAN, Am. Nat. Hist. Vol. 2, p. 157.
L. americanus. BACHMAN, Ac. Sc. Phil. Vol. 7, p. 326.
L. sylvaticus. ID. ib. Vol. 7, p. 403; and Vol. 8, p. 78.
L. americanus. EMMONS, Mass. Report, 1840, p. 56.

Characteristics. Yellowish grey, varied with brown; throat and abdomen whitish; in winter, the grey color predominates. Ears shorter than the head. Length 15 – 18 inches.

Description. Form typical. Forehead convex. Claws sharp pointed, and nearly straight. Upper anterior incisors white, with a deep longitudinal groove near their inner margins; the small incisors behind short, appressed to the anterior incisors, and inserted into the upper maxillary. First molar above simple, recurved; the four succeeding larger, and of nearly an equal size, composed of double folds of enamel; the last simple, cylindrical, directed forwards, and scarcely attaining the height of its predecessors. Beneath, the incisors are smooth; in front, long and subquadrate. The first molar inclined backwards, grooved before, and with a double groove on the outer surface; the succeeding ones to the last, upright, nearly equal, with a single groove and two prominent ridges on their external surfaces; the last smallest, inclined forwards, with a slight groove on the external surface, and the tip exhibits a double case of enamel.

Color. In summer, the general color is yellowish brown, which becomes more or less rufous on the outer surface of the extremities, and on the breast. Margin of the eyes blackish brown, and outside of this a circle of yellowish white. Throat, and underside of the tail, white; abdomen greyish white. Ears edged with white, and tipped with brown. Fur plumbeous at base, and for much of its length. In winter the fur becomes longer, and the upper surface of the head and body lighter, occasionally iron grey, but I have never seen it as white as is stated by Godman. There may, however, be white varieties, but it cannot be said to have two distinct coats of fur.

Length of head and body,..	16·0.	Length of the hind legs, ..	10·4.
Ditto of the head,.....	3·8.	Ditto of the tail, ...	1·5.
Ditto of the ears, ...	3·2.	Ditto, including fur, ...	2·8.

Weight,..... 3 – 4 lbs.

This common and well known species in the United States, has been, until very recently, confounded with others. The following description by Schreber, which seems to have been overlooked by modern writers, applies remarkably well to our Rabbit; although, misled by

the accounts of previous naturalists, he appears to have confounded its history with the following species: Cheeks full of thick hair. Ears thin externally, with few hairs, naked within, and when bent forward, do not reach the nose; when bent backwards, they reach the shoulder blades. Eyes large and black, with 4 – 5 bristles above them. Whiskers mostly black; some are white; the longest appears to reach beyond the head. Color in summer: Ears brownish, with a very narrow black border on the outer margin, of the same breadth to the tips, or becomes effaced; brown cheeks, back and sides; fore and hind legs light brown externally, mixed with black; all round the breech, white. Feet full of short hair of a light brown, unmixed with black, changing towards the inside to a grey white. Upper part of the tail like that of the back, (perhaps mixed with black, as Pennant describes it black;) beneath white. Throat white; lower part of the neck bright brown, mixed with white; chest and belly, inside of fore and hind legs, white. Color in winter, when it does change, white.

According to Foster, Pennant and Schœpff, the most remarkable distinctions of this species are, 1, his size: It is not by any means as large as the common and changeable hare, and scarcely larger than a rabbit; hence he is frequently called *rabbit* in America. 2, the proportion of his legs; the hind feet being longer, and the fore feet shorter than in the others. 3, the color and length of ears: it has a black margin outside, but no black mark at the tip, and the length is less than that of the common hare. 4, the upper side of the tail is not so black as in that species. 5, the color of its body. 6, its mode of living and habits: It can therefore only be a distinct species. Length 18 inches; tail scarcely more than two. Found from Hudson's Bay to Florida. In winter, his short hair changes into a long silky fur, white from the roots. The border of the ear, and upper part of the tail, unchanging. In the southern part of the State of New-York, and the Southern States, he does not change his color, and might therefore be called *the half-changing hare*.

The whole history of the habits of this species, and its abundance, sufficiently confirms the fact that Schreber had our Rabbit in view, although he was misled by Schœpff and Pennant, and confounded two species. We think that in this latter particular, Erxleben has also been in error.

The American Grey Rabbit changes but little with the season, except that the fur is longer and finer, and exhibits a slight tendency to white. Prof. Emmons speaks of having seen them distinctly grey in Massachusetts, and Dr. Bachman has seen them in Carolina of a light iron grey. It is a timid, inoffensive creature; and were it not for its excessive vigilance, and its astonishing powers of reproduction, would soon be extirpated. Indeed we have reason to believe that this actually does happen in certain districts; when their enemies, having nothing to feed upon, also disappear; and after a certain period, the rabbit again resorts to its former haunts, and, undisturbed for some time, increases again in numbers. Beside man, it has many other enemies. In the northern and western part of the State, it is the favorite food of the two lynxes. It is also destroyed by the New-York weasel, the skunk, and by hawks, owls and serpents.

Its food consists of bark, buds, grass, wild berries, etc.; and in cultivated districts, it is said to enter gardens and destroy vegetables. Unlike its congeners, it does not confine itself

to the woods, but is frequently found in open fields, or where there is a slight copse or under-brush. It does not burrow like its closely allied species the European Rabbit, but makes its form, which is a slight depression in the ground, sheltered by some low shrub. It frequently resorts to a stone wall, or a heap of stones, or a hollow tree, and sometimes to the burrow of some other animal. Its habits are nocturnal; and they may often be seen in the morning, or early part of the afternoon, although in retired situations they have been seen at all times of the day. Its flesh, though black and dry, is well flavored, although in this respect it varies with the quality of its previous food. It breeds in this State, as I have been informed, three times in the season, producing from four to six at a birth. It is the smallest of the species found in this State, and so much resembles in its form the European Rabbit, that the same popular name has been applied to it, although differing in color and some of its habits. This, however, is of no consequence, for the name of American or Grey Rabbit is sufficiently distinctive.

It has not a wide geographical range. It is found from New-Hampshire to Florida, but its western limits are not yet established.

THE NORTHERN HARE.

LEPUS AMERICANUS.

PLATE XXVI. FIG. 2, WINTER DRESS. — (STATE COLLECTION.)

Lepus americanus. ERXLEBEN, Syst. Reg. An. p. 330.
L. virginianus. HARLAN, Fauna Americana, p. 196.
L. variabilis, var. GODMAN, Am. Nat. Hist. Vol. 2, p. 161.
American Varying Hare. DOUGHTY, Cab. Nat. Hist. Vol. 1, p. 217, pl. 19, (autumnal dress.) AUDUBON, Orn. Biog. Vol. 2, p. 169, pl. 181, (winter dress.)
L. americanus. RICHARDSON, F. B. A. Vol. 1, p. 217, (excl. syn.)
L. virginianus. BACHMAN, Ac. Sc. Vol. 7, p. 301.
L. americanus. ID. ib. Vol. 8, p. 76.
Prairie Hare. EMMONS, Mass. Report, 1840, p. 58.

Characteristics. Winter dress white, or white tinged with reddish brown. Summer, more reddish brown; beneath white. Ears scarcely shorter than the head. Larger than the preceding. Length 20 – 25 inches.

Description. Head short; nose blunt. Eyes large and prominent. Ears broad and approximated, three and a half inches long. Upper anterior incisors long and slender, moderately grooved; the small posterior incisors not as large as in the preceding species; lower incisors wedge-shaped, nearly straight. Molars more compressed and broader than in the preceding. Skull depressed between the orbits. Body covered with loose, shaggy hair. Hind legs nearly or quite twice the length of the fore legs. Feet thickly covered with hair above and beneath, concealing the long, thin and slightly curved claws. Whiskers long and numerous, black or black and white; a tuft of three or four over the eyes, and some beneath the chin.

Color. Independently of the change by season, it may be said that at no time, unless in

high northern latitudes, can two individuals be found marked precisely alike. At all seasons, the base of the fur is plumbeous above and white beneath. Winter dress: White or nearly so, with irregular spots and dashes of a bright fawn-color, which is more apparent on the fore legs, ears and buttocks; ears margined with blackish brown above, becoming deeper towards the tips; tail and all beneath white. Summer dress: Above bright fawn or reddish brown; forehead, cheeks and ears of the same color; all beneath white; edges of the ears white, bordered with darker, particularly towards the tip. At all seasons, the hair on the soles is soiled white; margin of the eyelids dark brown; pupil dark brown; iris yellowish.

Length of the head and body,	20·0.	Length of the tail,	4·5.
Ditto of the head,	3·6.	Ditto of the fore legs,	6·5.
Ditto of the ears,	3·4.	Ditto of the hind legs,	11·2.
		Weight,	6½ lbs.

The dimensions of this species, on the authority of Bachman, vary from seventeen to twenty-five inches. It is remarkable how two observers have so widely differed in their account of the dimensions of the same specimen. Bonaparte gives the total length as thirty-one inches. Harlan's measurement of the same specimen makes it but sixteen inches. These statements may be reconciled, when we recollect that the latter measured from the specimen when it was set up, whilst Bonaparte's dimensions were taken from the specimen when recent, and probably represented the distance from the nose to the extremity of the hind legs.

This Hare was first vaguely indicated by Erxleben in 1777, but his name appears to have excited little attention. The work is exceedingly rare and difficult to procure, and the species continued to be confounded with the *L. variabilis* of Europe for nearly sixty years. Dr. Harlan carefully examined it, and determined it to be a distinct species, and not being aware of Erxleben's name, (which, it may be observed parenthetically, will apply to half a dozen northern hares,) gave it the name of *virginianus*.

It occurs in most parts of the State, and is often called the *White Rabbit*. In the winter, the markets of New-York are abundantly supplied with this species from the Kaaterskill and Shawangunk (Shongo) mountains. As an article of food, it is highly esteemed by many; but, as we suppose, rather from an association of ideas connected with the European hare, than from any merit of its own. It is in itself insipid and tasteless, and not to be compared with the common rabbit. Its food is various, consisting chiefly of grasses, buds, bark, leaves and berries. According to Bachman, they are fond of the young twigs of the spicewood (*Laurus benzoin*), the black poplar (*Populus hudsonica*), and the leaves and berries of various species of Pyrola or Pipsiseway. It lives exclusively in elevated and dry forests of pines and firs, never venturing upon cleared or cultivated lands. Its period of gestation is about six weeks, producing from four to six young at a litter. It makes more resistance when seized than any other species, using its teeth and nails with great freedom. Under certain circumstances, however, all hares will exhibit considerable boldness. We have been informed by an eye-witness, that he saw a European buck rabbit (*L. cuniculus*) attack a cat, and rip open its bowels by a single stroke of its hind claws.

The geographical range of this species is not yet well determined. According to Richardson, it is found in Canada as far north as Hudson's Bay. It is found throughout the Northern States, and as far south as the northern parts of Pennsylvania. Mr. Doughty, in his Cabinet of Natural History, states that he has seen it as far south as Virginia, on one of the highest mountains in the northern part of that State.

We subjoin the description of Erxleben, cited above:

Lepus americanus, L. Cauda abbreviata; pedibus posticis corpore dimidio longioribus; auricularum caudæque apicibus griseis.

Die Hasen. KALM, Hudson's Bay Quadrup. BARRINGTON, Phil. Trans. Vol. 62, p. 11.
American Hare. FORSTER, Phil. Trans. Vol. 62, p. 376.

Magnitudine medius inter *L. cuniculum* et *timidum alpinum* (sc. *L. timidus*, Forster, Phil. Trans. Vol. 67, p. 343, et Vol. 62, p. 375). Auricularum et caudæ apices perpetuo grisei. Pedes postici longiores quam in *L. timido* et *cuniculo*. Color griseo-fuscus; hieme in frigidioribus albus.

Habitat in America boreali, ad fretum Hudsonis copiosissimus. Nocturnus. Non fodit. Degit sub arborum radicibus inque cavis arboribus. Parit bis vel semel in anno; pullos quinque ad septem. Caro bona, colore *L. timidi*.

(*EXTRA-LIMITAL.*)

L. glacialis, Leach. (BACHMAN, Ac. Sc. Vol. 7, pl. 21. Summer dress.) In winter white, summer light grey; ears black. Length 27 – 30 inches. *Maine, Newfoundland.*

L. aquaticus. (BACHMAN, Ib. Vol. 7, pl. 22, fig. 2.) Nearly black above, white beneath; ears not as long as the head; feet long and narrow. Length 25 inches. *Alabama, Louisiana.*

L. palustris. (BACHMAN, Ib. Vol. 7, pl. 15, 16. AUDUBON, Birds, pl. 366.) Yellowish brown above, beneath grey; ears much shorter than the head; eyes small. Tail very short, ashy beneath. Length 14 inches. *South Carolina to Texas.*

L. campestris. (RICHARDSON, p. 224.) Lead-colored above, white beneath; in winter pure white, except the ears, which are broadly edged with reddish brown. Length 22 inches. *Northern Regions.*

L. longicaudatus. (GRAY, Loud. Mag. 1837. BACHMAN, Ib. Vol. 8, p. 83.) Blackish brown above, white beneath. Body slender. Tail 4 – 5 inches. Length 24 inches. *Texas.*

L. nigricaudatus, Bennet. (BACHMAN, Ib. Vol. 8, p. 84.) Above fawn tipped with black, beneath white. Tail above black. Length 22 inches. *Texas, Mexico.*

L. californicus. (GRAY, Loud. Mag. 1837.) Dark brown above, beneath white tinged with yellow; ears longer than the head. Length 25 inches. *California.*

L. richardsoni. (BACHMAN, Ib. Vol. 8, p. 88.) Mottled grey above, beneath white, tinged with pale yellowish towards the sides; ears longer than head. Length 19 inches. *California.*

L. townsendi. (BACHMAN, Ib. Vol. 8, p. 90, pl. 2. *L. nuttali*, young, ejusd. auctoris.) Above light grey, beneath white; ears longer than the head, white behind, tipped with black; legs and tarsus very long. Length 26 inches. *Oregon.*

L. artemesia. (Bachman, Ib. Vol. 8, p. 94.) Grey above, beneath white; back of the neck and legs pale rusty; ears as long as the head. Length 13 inches. *Oregon.*

L. bachmani. (Bachman, Ib. Vol. 8, p. 96.) Deep grey above, beneath greyish white; ears longer than head. Length 11 inches.

Genus Lagomys, *Geoffroy.* Ears moderate; hind legs not much longer than those before; clavicles more developed than in *Lepus;* molars ten above and ten beneath. Tail none.

L. princeps. (Richardson, F. B. A. pl. 19.) Blackish brown above, beneath greyish fawn; head short and thick; ears broad and rounded; legs short; toes with naked tubercles. Length 6 – 7 inches. *Rocky Mountains.*

ORDER V. EDENTATA.

Without incisors, and in several of the genera, with no teeth whatever. They have large and strong claws, covering the ends of the toes. Covered with long and coarse hairs, or with scaly plates. Occasionally the mouth drawn out into a flattened beak, and presenting great anomalies in their reproductive organs. Not ruminating. Feed chiefly on vegetables, but also on insects and carcases.

Obs. About twenty-four species, arranged in fourteen genera, are known at present, in North and South America, Africa, India and Australia. Although numerous in the hot and temperate parts of South America, no living representative of this order has been found within the United States. Two fossil genera have been described, but neither have been discovered in this State.

(*EXTRA-LIMITAL.*)

Genus Megatherium, *Cuvier.* Anterior toes four, posterior three. Size gigantic. Claws large, and with a bony sheath. Molars eight above and eight beneath; crowns of the molars with two transverse angular ridges. Body covered with a bony coat of armor. Tail large and very robust. Clavicles perfect. Herbivorous.

M. cuvieri. (Mitchill, Ann. Lyc. Vol. 1, p. 58. Cooper, Ann. Lyc. N. Y. Vol. 1, p. 114, pl. 7; Vol. 2, p. 267.) Toes with strong claws, two of which are rudimentary. Height seven feet; bulk of the rhinoceros. (Marshes of Skidaway Island, Georgia; and said to exist also at White Bluff, sea coast of Georgia. Originally found near Buenos Ayres. Another from the Rio del Sauce, near Montevideo.)

Genus Megalonyx. Claws large, nearly seven inches long, and furnished with a bony sheath. Molars eight beneath, composed each of a simple cylinder of enamel; crowns simple cavities, surrounded by the enamel. Clavicles perfect.

M. jeffersonii. (CUVIER, Oss. Foss. Ed. tertia, p. 160. COOPER, Ann. Lyc. Vol. 3, p. 166; Am. Month. Mag. Vol. 1, p. 157. — *M. laqueatus.* HARLAN, Ac. Nat. Sc. Vol. 6, p. 269; Med. and Phys. Res. p. 271, 319 et. seq.) About the size of an ox. The teeth, as far as they have been examined, seem to present some striking differences; and Dr. Harlan seems disposed to consider some of them as indicating the type of a new genus, which he terms *Pleurodon.*

The remains of this animal have been found in Bigbone Cave, Tennessee; at Bigbone Lick, Boone county, Kentucky; in a cave in Greenbriar county, Virginia; and at White Cave, Edmondson county, Kentucky. They have also been discovered in the banks of the Rio Brazos, a few miles above St. Felipe, Texas, associated with the bones of the Mastodon; and according to Martius and Spix, in a cave in Brazil. The fullest and best account of its osteology will be found in the work of Harlan, cited above.

ORDER VI. UNGULATA.

Comprises numerous herbivorous animals, exhibiting great variety in size and structure, but all united by one common character, viz: The toes covered by a horny case or hoof, which either embraces the toes separately, or the foot is enclosed in a single hoof. In some the muzzle is elongated into a cylindrical tube; in others, the head is furnished with simple or branched horns, which are sometimes only sexual distinctions.

FIRST TRIBE. PACHYDERMATA.

Generally three sorts of teeth. Stomach simple or compound, but not adapted for rumination. No horns on the head. Many of the species extinct.

FAMILY I. ELEPHANTIDÆ.

Toes concealed under the skin, their tips only distinct. Snout elongated into a long and flexible proboscis. The largest of terrestrial animals, and in the living state, found only in the Eastern Continent. It comprises the Elephant, Mastodon, Rhinoceros and Hippopotamus, embracing at present eight living and twenty-one fossil species.

GENUS ELEPHAS. *Linneus.*

Upper incisors in the form of enormous tusks, slightly arched towards the tips, a vertical section presenting curvilinear lozenges. Molars four above and four beneath, composed of vertical laminæ. With a long flexible proboscis. Five toes on all the feet. The skin of the living species thick, with scattering hairs.

THE FOSSIL ELEPHANT.

ELEPHAS PRIMIGENIUS.

(CABINET OF THE LYCEUM.)

MITCHILL, Cuv. Theory, N. Y. Ed. figure.
HARLAN, Ac. Sc. Phil. Vol. 3, p. 65, pl. 5.

Numerous remains of the Fossil Elephant, belonging apparently to the species *primigenius*, have been found in various parts of North America, from the frozen mud near Behring's Straits, to the marshes of Carolina and Texas.

The multitude no less than the magnitude of these bones in certain localities, is well calculated to excite astonishment. Hedenström, in his survey of the Laechow islands on the north-eastern coast of Siberia, remarks that the first of these islands is little more than one mass of these bones; and that although the Siberian traders have been in the habit of bringing over large cargoes of them for upwards of sixty years, yet there appears to be no sensible diminution. The teeth (tusks?) found in these islands are much whiter and more fresh than those of the continent. The most valuable were met with on a low sand bank on the western coast; and there, when, after a long prevalence of easterly winds, the sea recedes, a fresh supply is always found. From this, Hedenström infers that large quantities must exist at the bottom of the ocean.

One of the most singular discoveries in modern times, was that of an extinct elephant imbedded in a mass of ice on the northern coast of Siberia. Its body was nearly entire, and covered with thick fur, consisting of coarse hair from ten to fifteen inches long, and beneath this a slightly curled wool. Specimens of this hair may be seen in the Cabinet of the Lyceum of Natural History, New-York.

Fischer has analysed and distinguished six fossil species of Elephants; and Dr. Harlan appears to think it probable that two distinct species once existed in the United States, but the peculiar characteristics of each do not seem to be distinctly defined. According to Cuvier, the fossil elephants belonged to a geological period more ancient than the Mastodon, but we often find them associated together in the same formation. It is true that little more than the molars only have been discovered, thereby seeming to indicate that all the other bones had perished at a period long anterior to the destruction of the Mastodon. We should, however, recollect that the osteology of the two genera are very intimately allied; and that from the fact that greater numbers of teeth of the Mastodon have been found, all the large bones are, without due examination, hastily referred to that genus. Besides the molars of the Elephant, few of the other portions of the skeleton have been identified. At Bigbone Lick, where their remains as individuals appear to be in proportion to the Mastodon as one to five, little more than the bones of the head, and in one instance two nearly complete heads, have been identified. Moreover, it does not appear ever to have been as numerous a species as the Mastodon.

The principal localities of the Fossil Elephant in the United States, are the Bigbone Lick, Kentucky; Biggin Swamp and Stone, South Carolina; Ohio, Pennsylvania, North Carolina, Maryland, and Schooley's mountain in Monmouth county in New-Jersey. In this State we are acquainted with but one locality. There is, however, in the Museum of the Albany Institute, a portion of the tooth of an elephant said to have been found on the line of the Erie canal, but the precise locality is not known.

AMERICAN ELEPHANT.

ELEPHAS AMERICANUS.

PLATE XXXII. FIG. 2.—(CABINET OF THE LYCEUM.)

It is with some hesitation that I venture to designate, under a new name, a species founded on specimens of teeth, which appear to differ widely from any hitherto met in this country. The tooth found on the banks of the Susquehannah, near Tioga, March, 1786, and figured in the Columbian Magazine, approaches it somewhat, but can scarcely be referred to the same species. The specimens above alluded to were found in a diluvial formation near the Irondiquoit river in Monroe county, ten miles east of the city of Rochester. According to a writer in the American Journal, Vol. 32, p. 377, these remains consisted of a tusk and two molars, one of which is in the Cabinet of the Lyceum, and is that figured in the plate. This is six inches in its greatest depth; and, as nearly as can be conjectured from the part which remains, it must have been about eight inches long, and three in breadth on its grinding surface, which is, however, too much injured to exhibit the ends of the enamel. There are thirteen plates in a space of five inches, and they are more compressed than in any fossil species with which I am acquainted, being almost in contact, with very little interstitial substance. It is altogether different from any fossil elephant hitherto described, and merits the distinct appellation of *E. americanus*.

NOTE. Texas appears to be a rich locality for elephantine bones. From the Houston Telegraph, April, 1840, we learn that a large collection of molars, tusks and other bones of the Elephant, were found in the banks of a ravine about two miles below Bastrop, covered with a bed of loam ten or twelve feet thick. A similar collection was obtained from the bed of the Rio Brazos. They were associated with the teeth and tusks of the Mastodon, described in the subsequent article. Some of the teeth are now in the Cabinet of the Lyceum of Natural History, New-York.

GENUS MASTODON. *Cuvier.*

Many characters in common with the Elephant, which it equalled or surpassed in size. Molars with sharp, elevated, conical teeth, which, when partly worn, display lozenges of enamel. In the adult, four molars above and four below. A vertical section of the upper incisors or tusks exhibits concentric plates of enamel. In the young, there are two incisors in the lower jaw, straight, short and conical. Tail moderate, about the length of that of the Elephant.

Obs. The whole amount of teeth in the Mastodon, from infancy to old age, appears to be twenty-six. In infancy, sixteen molars and two lower incisors; the hindmost molars, as they emerge, gradually pushing the others forward and out of their places, until the latter all drop out, and a large solitary tooth is left in each jaw. It is obviously inferred that they possessed long flexible trunks, as in the Elephants; and its habits are similar, though less exclusively herbivorous.

THE GREAT MASTODON.

Mastodon maximus.

(CABINET OF THE LYCEUM.)

Animal incognitum. Rembrant Peale, Hist. Disq. Loud. Mag.
Mastodon giganteum et *maximus.* Cuvier, Oss. Foss.
Rhinoceros, Tetracaulodon and *Mammoth,* of various writers.*

From an early period in the history of this country after its settlement by Europeans, large bones were occasionally found, which excited considerable speculation. They were considered, according to the intelligence of their respective discoverers and commentators, as having belonged to a race of giants or fallen angels, or to have belonged to Elephants. It was reserved for Cuvier, in the work cited above, to show that they belonged to an animal generically

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* The American authorities are so numerous, that it would require too much space to insert them all. For those who are disposed to investigate the American history of the discovery of this animal, we would make the following references:

Mather, Royal Philos. Trans. 1712.
Dudley, Mass. Hist. Coll. 2nd series, Vol. 2, p. 263.
Turner, Am. Phil. Trans. Vol. 4, p. 510.
Hunter, Am. Museum, Vol. 5, p. 152.
Collinson, Ib. p. 155; Ib. Vol. 8, p. 284.
Madison, Phil. Med. & Phys. Vol. 2, p. 58; Ib. Vol. 1, p. 156.
Bossu, Ib. Vol. 1, p. 179.
Jefferson, Ib. Vol. 1, p. 64.
Barton, *Rhinoceros!* Ib. Vol. 2, p. 1, p. 158.
Drayton, Hist. Carolina.
Graham & Miller, Med. Rep. Vol. 4, p. 211 and 308.
Mitchill, Med. Rep. Vol. 9, p. 322; Vol. 11, p. 318, 319.
Madison, Ib. Vol. 15, p. 38.
Cuvier, Theory of the Earth, N. Y. Ed.
Peale, Am. Phil. Trans.
Godman, Vol. 3, p. 478; Vol. 4, p. 317.
Id. Ac. Nat. Sc. Vol. 4, p. 67.
Harlan, Fauna Americana.
Id. Med. and Phys. Researches.
De Kay, &c. Ann. Lyc. Vol. 1, p. 143.
Cooper, Am. Jour. Geol. Vol. 1, p. 158.
Id. Am. Jour. Sc. Vol. 12, p. 381; Vol. 14, p. 187; Vol. 27, p. 166; Vol. 31, p. 171.

distinct from the Elephant, but allied to it in bulk, habits and other particulars. Since that time, numerous species have been described in various parts of the world.

In this country, there is scarcely a State east and south of the Hudson river, which has not afforded specimens of the Mastodon. Along the Atlantic coast, few remains have been found east of that river. The chief localities we have noted were at Cheshire, Connecticut, thirteen miles north of New-Haven, in diluvial gravel (Am. Jour. Vol. 14, p. 187); and at Berlin and Sharon in the same State (Id. Vol. 27, p. 166). We are not aware that any have been found in the more northerly States, although, on the western coast of America, they have been found in the latitude of 66° north.

In this State, the remains of this animal were discovered near Claverack, as early as 1705, and formed the subject of a note from the celebrated Dr. MATHER, which appeared in the English Philosophical Transactions, 1705, July 23: "There is a prodigious tooth brought "here, supposed to be the tooth of a man, from the shape. It weighs $4\frac{3}{4}$ lbs. It was dug "up on the side of a hill, thirty or forty feet under ground, near a place called *Claverack*, "about thirty miles this side of Albany. It is looked upon here as a mighty wonder whether the "tooth be of man or beast. Other bones were dug up, which crumbled away upon exposure "to air. They say one of them, which is thought to be a thigh bone, was seventeen feet long." (DUNLAP, *Hist. N. York*, Vol. 2, appendix, p. 154.)

In 1782, they were found in a swamp near Montgomery, Orange county, and in greater numbers at Shawangunk, Ulster county. Shortly after, portions of eight distinct individuals were discovered within eight or ten miles of Montgomery. In 1801, Mr. Peale succeeded in disinterring, from this region, an almost entire skeleton.

Since that period, other localities have been discovered, the most remarkable of these are,

1. From Rockland county, in 1817; and from Chester, Orange county, of which numerous specimens are in the Cabinet of the Lyceum. A full account of the exploration connected with these bones may be found in the American Edition of Cuvier's Theory of the Earth, before referred to.

2. In the same year, remains were found in the city of Rochester, four feet below the surface, in a hollow or water course.

3. In 1823, more than one-half of a lower jaw, with the teeth, on the shore of Long-Island, between high and low water mark, about four miles east of the county court-house at Riverhead, Suffolk county. It is now in the Cabinet of the Lyceum of Natural History, New-York. It may be noted that a very large molar, in Dr. Morton's collection, was fished up from a similar locality, namely, in the ocean at Longbranch, New-Jersey. The bed of the German ocean appears to be a rich locality for the bones not only of the mastodon, but also of the elephant. In Loudon's Magazine for 1839, there is a figure and description of the molar of a mastodon dredged from the Dogger Bank; and Woodward, in his Geology of Norfolk, states that upwards of two thousand molars of the elephant (and probably of the mastodon), had been dredged up by the fishermen of one little village (Hasbro'), in the space of thirteen years.

4. At Genesco, Livingston county, (see Am. Jour. Vol. 12, p. 381,) the greater part of a skeleton was found in a marsh two feet and a half below the surface, in vegetable mould, and resting upon a bed of fine white gravel.

5. In 1834, the molar tooth of this species was found near Jamestown, Chautauque county. This is stated in the 27th volume of the American Journal of Science to have been two and a half inches long and one inch broad, and to have been found ten feet below the surface.

6. A fine portion of the lower jaw of a young mastodon, from the town of Montgomery, Orange county. This specimen enlarged our knowledge of the dentition of the mastodon, exhibiting two short straight tusks from four to six inches long. It would appear that these lower incisors are in some instances permanent for a considerable period; but whether this is a sexual characteristic, or an accidental case of anomaly, is not yet determined. Upon this specimen, however, the reader will find an attempt made to construct a new genus under the name of *Tetracaulodon*.

7. In the town of Shawangunk, Ulster county.

8. At Perrinton, near Rochester, Monroe county.

9. At Coeymans, Albany county.

10. At Hinsdale, Cattaraugus county, a tusk was found seventeen feet beneath the surface. The soil was composed of alternate strata of sand and gravel.

11. In 1841, in a bed of marl three miles south of Le Roy, weighing two pounds.

12. A tooth was found in digging a mill-race on Goat Island, Niagara county, twelve or thirteen feet below the surface.

The Great Mastodon, or *Mammoth*,* as it is sometimes improperly called, equalled or exceeded the Elephant in bulk, and greatly resembled him in shape. The greatest difference in this latter particular was in the elevation of the fore shoulders, while in the elephant the back was regularly arched. Cuvier, from an examination of the situation and direction of the pelvis, inferred that the belly must have been smaller, and consequently the intestines less voluminous than in the elephant; and this, in connection with the structure of the teeth, leads us to the conclusion that the mastodon did not exclusively feed on leaves, limbs and tops of young trees. The position of the molars, which diverge in front from each other, also varies from those of the elephant, and much more nearly resembles those of the hog and hippopotamus. To these animals it would seem that he is still farther allied, in his fondness for swamps and marshy places, where his bones are for the most part found under circumstances which lead to the irresistible conclusion that he lived and perished in those places. It was at first supposed that it was exclusively a northern animal, and like the fossil elephant of Siberia,

* The impropriety consists merely in using a term which had been specially applied by the inhabitants of Siberia to a fossil elephant; but as the two fossil animals are both gigantic, and nearly allied, we saw no reason for announcing in characters as large as a modern play-bill, the following label over the bones of the Mastodon in the Collection of the Garden of Plants at Paris: "Le Grand Mastodon, improprement nommé *Mammouth* par les Anglo-Americains"! We believe this offensive label has been recently removed.

furnished with hair adapted for its residence in a cold region. Other species, however, were soon discovered in South America, and subsequently in the Burman Empire. The genus Mastodon then embraces species found in almost every part of the world, and in all latitudes. In the United States, but a single species has been found; and its remains, thus far, have been found along the Atlantic coast, from New-York to the Gulf of Mexico. In South America, he appears to have been replaced by another species (*angustidens*).

The geological period at which this huge animal existed, has occasioned much attention. It must have been among the most recently extinct of all quadrupeds, unless we except some species whose generic types still exist on this continent. Rejecting as altogether fabulous the pretended discovery of the stomach of this animal, with its contents, consisting of reeds, twigs and grass, as detailed by Barton (Med. and Phys. Jour. Vol. 3, p. 23), it has certainly been discovered in positions indicating that the animal perished and left its bones on or near the surface where they are now found. Cuvier states that the mastodons discovered near the Great Osage river, were almost all found in a vertical position, as if the animals had merely sunk in the mud (Oss. Foss., Ed. alt. Vol. 1, p. 217, 222). Since that time, many others have been found in swamps, a short distance beneath the surface, (frequently some of the bones appearing above the soil,) in an erect position; conveying the perfect impression that the animal (probably in search of its food) had wandered into a swamp, and unable to extricate himself, had died on the spot. Such an incident doubtless occurred to the animal whose bones we assisted to disinter, some years ago, at Longbranch, New-Jersey. He was in a natural vertical position, his body supported by the turf soil or black earth, and his feet resting upon a gravelly bottom. The occurrence of the bones of other animals not yet extinct, in company with those of the mastodon, is not a conclusive evidence of their cotemporaneous existence; but we cannot deny that it furnishes strong reasons for believing them to have been of a very recent date. We think it highly probable that the mastodon was alive in this country at a period when its surface was not materially different from its actual state, and that he may have existed cotemporaneously with man.

There is one fact connected with the discovery of the bones of the mastodon in this country, which appears to have been passed over as doubtful or apocryphal. We allude to the possibility, that upon a due investigation, some of the softer parts may be detected. Mr. Graham, an intelligent observer, when describing (Med. Repos. Vol. 4, p. 414) the mastodon bones in Montgomery, states, that "hair was found three inches long, and of a dun color." Judge Miller, in describing the appearance of the skeleton at Shawangunk, Ulster county, says, that "around and in the immediate vicinity were locks and tufts of hair of a dun brown, an inch "and a half to two and a half inches long, and in some instances four to seven inches in "length." This description corresponds with the specimen from the fossil elephant of Siberia, in the Cabinet of the Lyceum. In the account of another specimen, Mitchill (Appendix to Cuvier's Theory) says, "Beneath the bones, and immediately around them, was a stratum of "coarse vegetable stems and fibres resembling chopped straw, or rather drift stuff of the sea; "for it seemed to be mixed with broken fibres of conferva, like those of the Atlantic shore." Whether the original observers were deceived by mistaking this appearance for hair, or

whether Mitchill himself was misled, it is probable that both alluded to the same substance. It is now impossible to determine this point, but it is to be regretted that a more critical examination was not made at the time, and the substances themselves submitted to chemical analysis.

FAMILY II. SUIDÆ.

With teeth of various kinds. Toes more than two, cleft into distinct hoofs. Muzzle for the most part elongated.

Obs. The animals of this group are distributed over the globe, and comprise at present about twenty species. More than double that number of extinct species have been discovered. In this State we have but one representative of this family, and that one has been introduced from Europe.

GENUS SUS. *Linneus.*

Four toes on all the feet; the two posterior short, not touching the ground. Incisors, $\frac{6}{6}$; *canines,* $\frac{2}{2}$; *cheek teeth,* $\frac{14}{14} = 44$. *Lower incisors nearly horizontal. Canines often very large, triangular, directed outwards. Body covered with strong bristly hair.*

THE COMMON HOG.—(*Introduced.*)

Sus scrofa, Var. domestica.

This well known and useful animal is derived from the Wild Boar, still found in the temperate regions of Europe and Asia. It accompanied the first settlers in this State, and soon became numerous. "Some of our people," observes Vanderdonck, "prefer the English "breed, as they are more hardy, and subsist better in winter without shelter; but the Holland "breed grows much larger and heavier, and have thicker pork." From the same writer we learn that it was a common practice at that time in the neighborhood of New-York, to drive the hogs into the woods in the spring, and to recall them in the autumn; a practice which is still kept up in the thinly settled portions of the State at the present day. The sow goes with young about four months, and produces eight to twelve, and even more, at a litter.

Traces of the large limbed Dutch breed of hogs may still be found in some districts, which have been known to weigh more than a thousand pounds. Our common breed of hogs has been much improved of late years, by crossing with the English, Berkshire and Chinese varieties. The former is more particularly in request, on account of the flavor of its meat, and as producing large litters. We think it susceptible of still farther improvement, by judicious crossing with the old Dutch breed alluded to above.

(*EXTRA-LIMITAL.*)

Genus DICOTYLES, *F. Cuvier.* Posterior feet with three toes only, the external wanting. Incisors, $\frac{4}{6}$; canines, $\frac{2}{2}$; cheek teeth, $\frac{12}{12} = 38$. A fetid gland on the lumbar region. Tail obsolete.

D. torquatus. (NUTTAL, Trav. in Ark. p. 155. CUVIER, Mam. plate.) A whitish band descending obliquely from each shoulder to the sides of the neck. *Red river, Arkansas.*

Genus TAPIRUS, *Brisson.* The existence of this genus within the limits of the United States, rests upon a single fossil tooth from Bigbone Lick, and described by Dr. Harlan (Fauna, p. 224) under the name of *Tapirus mastodontoides.* It has been questioned whether this may not have belonged to a young mastodon, but the comparison instituted by Dr. Harlan (Med. and Phys. Res. p. 265) at Paris, establishes clearly its position in this genus.

FAMILY III. EQUIDÆ.

A single solid hoof, with but one apparent toe; although they have, beneath the skin, two protuberances on each side, representing lateral toes. Although exclusively herbivorous, they have nearly simple stomachs, and do not ruminate.

Of this family we have no native species. Two have been introduced.

GENUS EQUUS. *Linneus.*

Cutting teeth, $\frac{6}{6}$; *canines,* $\frac{2}{2}$, *seldom present in the female; molars,* $\frac{12}{12} = 40$. *Tail uniformly covered with long hair. Ears moderate.*

THE HORSE.—(*Introduced.*)

EQUUS CABALLUS.

This noble and useful animal is too well known to require description. Originally from Asia, where the species still exists in a wild state, it has been domesticated from time immemorial, and has been distributed by man over the globe. On this continent, troops of wild horses, from the domestic stock, are found in immense numbers. They are not uncommon on the extensive plains west of the Mississippi. They were once numerous on the eastern side of the Rocky mountains, near the northern sources of the Columbia river; but at present, they are said not to be found wild, north of the fifty-third parallel.

In this State, the Horse was introduced at an early period. Vanderdonck, speaking of the Horses of the Colony of Nieuw-Amsterdam, says, "The horses are of the proper breed for "husbandry, having been brought from Utrecht for that purpose, and this stock has not dimi- "nished in size or quality. There are also horses of the English breed, which are lighter, "not so fit for agricultural purposes, but are well adapted for the saddle. These are not so

"expensive as the Dutch breed, and are easily obtained, (from New-England?) *Curaso* or "Arabian horses are likewise imported into the country, but are not very acceptable, as they "can scarcely endure the climate, and often die in winter. Fine large horses are bred in the "country, which live long, and are seldom diseased." The Curaso horses, mentioned above, according to the Albany Dutch Records, were imported from the Island of Curaçoa, between which place and New-Amsterdam there was a brisk traffic carried on as early as 1637.

It appears from the statement given above, that the horses of this State were originally of the Dutch race, subsequently of the English stock, and were at that early period with an admixture of Arabian blood. Much attention has since been paid to the improvement of the breed, by the importation of the best Arabian horses; and we believe it is now generally conceded, that in the combined qualities of speed and endurance, the horses of this State are excelled by none in the world.

THE ASS.—(*Introduced.*)

EQUUS ASINUS.

This useful animal is a native of the East; it is considered to be generically different from the Horse by some writers, on account of its long ears, tufted tail, and the absence of callosities on its hind legs. It breeds occasionally with the horse, and the product is called a *mule* or *hinny*, according as the ass is the male or female parent. It is a hardy animal, requiring little care, but has not been much attended to in this State. In Kentucky, and some others of the western States, much attention has been paid to the ass, and its cross with the horse; and a fine breed has been raised, which readily commands high prices.

(*EXTRA-LIMITAL.*)

THE FOSSIL HORSE.

EQUUS MAJOR.

Teeth and bones of the Horse have been found in various parts of the Union, but I am unacquainted with any locality in this State. The nearest approach to it are the teeth and vertebræ found near the Navesink hills in New-Jersey, described by Mitchill in the Appendix to the New-York edition of Cuvier's Theory of the Earth, and also noted at pages 7 and 8 of his Catalogue of Organic Remains. They have also been found on the north branch of the Susquehannah; in digging the Chesapeake canal, near Georgetown, D. C.; and in North Carolina, sixteen miles below Newbern. They resemble those of the common domestic horse; but from their size, apparently belonged to a larger animal.

Second Tribe. Pecora.

No incisors in the upper jaw; canines for the most part wanting; molars of a uniform character, usually twelve above and twelve beneath. The two middle toes separate, as if cloven. Frontal bone, in the greater number of families, furnished with horns, at least in the male sex. With four stomachs. Chewing the cud, or ruminating. Herbivorous. Intestinal canal long. Teats between the thighs. Useful to man as beasts of burthen, or as food.

FAMILY IV. BOVIDÆ.

Horns in both sexes, persistent, usually round, smooth, pointed, never straight; increasing by ringlets at the base. The porous nucleus supporting the horn, is a prolongation of the frontal bone. No canine teeth.

Obs. This family comprises animals hitherto arranged under the genera Bos, Antilope, Capra and Ovis; and including, as now restricted, about eighteen species, included by the most recent writers under seven genera. But four species of this family are found in North America, and, with the exception of one introduced species, none now exist within the limits of the State of New-York.

GENUS BOS. *Linneus.*

Horns smooth, directed laterally at first, afterwards recurved, arising from the crest. Body thick and heavy. Limbs strong. Tail moderately long, with a terminal tuft of hair. Muzzle broad, black, naked. Hair smooth, straight.

THE COMMON OX.—(*Introduced.*)

Bos taurus.

The primitive stock of this animal, whose domestication has exercised such an extensive influence over the condition of man, is unknown. It was introduced into this State by the earliest colonists, and was originally of the large Holstein or Dutch breed; and it is but a few years since, on the Hudson and Mohawk, there existed undoubted remnants of stock imported by the Dutch settlers from Holland (Cultivator, Vol. 2, p. 28). We learn from Vanderdonck, that "the cattle in the New-Netherlands are mostly of the Holland breed. Many "were brought over from Amersfort in the province of Utrecht. They have also English "cattle in the country, purchased from the English in New-England." The principal and best varieties at the present day are of English descent, and great attention is paid to improve their most desirable qualities. It has been observed that the imported stock does not always

sustain its foreign reputation, in consequence of a change in its food, treatment, or perhaps from a difference in climate; but when mixed with our native stock, the half-bloods exhibit a decided improvement.

(*EXTRA-LIMITAL.*)

B. moschatus. (Godman, Am. Nat. Hist. Vol. 3, plate.) Horns contiguous, broad at the base, directed laterally and downwards against the cheeks, and ending in round points directed upwards. Now arranged under *Ovibos. Arctic Regions.*

(FOSSIL.)

B. bombifrons. (Phil. Soc. Vol. 1, p. 379. Harlan, p. 271. Cooper, Am. Month. Vol. 1, p. 172.) Summit of the head convex, arched; horns distant, rather flattened at base, projecting laterally and downwards. *Kentucky.*

B. latifrons. (Harlan, p. 273. Godman, figure. Cooper, Am. Month, Vol. 1, p. 173.) Summit of the head broader than high; horns long, round, and directed laterally and upwards. *Kentucky.*

B. pallasii. (De Kay, Ann. Lyc. Vol. 2, p. 280.) Summit of the head depressed; horns short, flattened and turned downwards. *Kentucky, Missouri.*

Genus Bison, *Smith.* (Extirpated.) Forehead slightly arched, much broader than high; shoulders elevated; tail short; legs slender; hair soft and woolly; a beard.

B. americanus. (Godman, Vol. 3, figure.) Horns small, round, directed laterally and upwards. Chesnut brown or blackish.

Obs. The Bison, or American Buffalo, has been long since extirpated from this State; and although it is not at present found east of the Mississippi, yet there is abundant testimony from various writers to show that this animal was formerly numerous along the Atlantic coast from New-York to Mexico. Warden asserts, that at no very distant period, it existed in Pennsylvania;* and as late as 1756, large herds were found in Kentucky. They are now only found on the plains of Missouri; and from the murderous warfare directed against them, the day is not far distant when the whole race will be extirpated.

FAMILY V. CAPRIDÆ.

Horns persistent, (in many genera exclusively in the males,) on a bony nucleus nearly solid: The horns for the most part simple, often compressed more or less, angular, with elevated knobs or rings at the base. No canine teeth.

Obs. This family contains, in the writings of the most recent systematists, between seventy and eighty species, arranged among twenty genera. It is composed of the old genera Ovis, Capra and Antilope, but comprises many new forms. We have but few representatives of

* One of our most learned and acute philologists states, that about the years 1785 or 1790, the bison was not uncommon on the Monongahela, Pennsylvania, adjoining Mason & Dixon's line. He has evidently been misinformed, not only in the fact that the bison is merely a variety of the European ox, but also in the assertion that the product of the bison and domestic cow will again propagate. (*Archæologia Americana*, Vol. 2, p. 139.)

this family in the United States, and, with the exception of two introduced species, none within the limits of this State. The *common goat* (Capra hircus) has been introduced, but not to any extent, and is considered of little value.

GENUS OVIS. *Linneus.*

Lower incisors eight. No muzzle. Horns (generally common to both sexes) with a cellular bony nucleus, large, triangular, directed backwards, and returning spirally more or less in front. No beard. Forehead arched. Tail short. Mammæ two, inguinal.

THE DOMESTIC SHEEP.

OVIS ARIES.

The primitive stock of this well known and useful animal is supposed by some to be the *O. ammon;* while others consider it to be a distinct species whose primitive type is the *O. musmon*, still found wild in the mountainous districts of eastern Europe.

The original stock of sheep in this State was derived from Holland, as we learn from Vanderdonck, who wrote about the year 1650. It is probable that they were almost immediately crossed with the common English breed, imported into the neighboring colony of New-England. "Sheep," he says, "are also kept in the New-Netherlands, but not as many as "in New-England, where the weaving business is carried on, and where much more attention "is paid to them than by the New-Netherlanders. The sheep, however, thrive well, and "become fat enough. I have seen mutton there so exceeding fat, that it was too luscious "and offensive. The sheep breed well, and are healthy; they find good pasture in summer "and good hay in winter; but the flocks require to be guarded and tended on account of the "wolves, for which purpose men cannot be spared. There is also a more important hind-"rance to the keeping of sheep, which are chiefly cultivated for their wool. New-Netherland "is a woody country throughout, being almost every where beset with trees, stumps and "brush-wood, wherein the sheep pasture, and by which they lose most of their wool. This "is not apparent until they are sheared, when the fleeces turn out very light."

It is interesting to compare the account of the early introduction of sheep into New-York, with the results after a lapse of nearly two hundred years. By the census of 1840, there were no less than 5,381,225 sheep in the State of New-York alone.

The common sheep of this State formerly yielded a coarse wool, scarcely averaging three pounds to the fleece; they were excellent breeders, and the young throve well even when entirely neglected. Within the last forty years, the introduction of foreign varieties, remarkable for the fineness of their wool and the improved quality of their flesh, has caused the old common stock in this State to disappear.

The first variety introduced into New-York, was the Spanish merino: this occurred in 1801. It was not, however, until seven or eight years after, that their importance began to be appre-

ciated. A *mania* for sheep then commenced, scarcely inferior to the *tulip mania* of Holland, or the *morus multicaulis speculations* of our own country at a recent period. As much as a thousand dollars, and in some instances nearly twice that amount, was paid for a single ram. Of the Spanish merino races, there are three distinct varieties, known under the names of the Paular, Negretti and Guadaloupe breeds.

The quality of the fleece was still farther improved in 1824, by the introduction of what are termed *Saxony sheep*. These are originally of the Spanish merino race, introduced into Saxony about one hundred years ago, and upon which great pains and care had been bestowed. To improve the quality of the flesh, our sheep have been still farther crossed with the Bakewell or New-Leicester breed, and also with the South-downs, both from England. The former was first introduced into this State in 1815, by Mr. Dunn of Albany, and the latter only a few years since.

The period of gestation in the Sheep is about five months, producing one or two at a birth, rarely more. The two middle incisors drop out at the end of the first year, and are replaced by others; at two years, the two next; at three, four are renewed; and at the end of the third year, or three and a half, all have been replaced, and the individual is then said to be full mouthed.

(*EXTRA-LIMITAL.*)

O. montana. *Argali, Big-horn, Rocky Mountain Sheep.* (Richardson, pl. 23. Godman, plate.) Horns in the male very large, contiguous, curved in a gentle spire; in the female, smaller, erect, slightly curved backwards and outwards. *Rocky Mountains.*

Genus Capra, *Linneus.* Teeth as in the genus Ovis; forehead concave; horns generally common to both sexes, either vertical or inclined more or less, angular; two sorts of hair; chin bearded.

C. hircus. Common Goat. Introduced.

C. americana, Blainville. (Ord. Ac. Sc. Smith, Lin. Trans. plate. Godman, Vol. 2, plate.) *Rocky Mountain Goat.* Horns black, nearly erect, conical, slightly curved backwards, obscurely ringed at the base, smooth and polished at the tips; muzzle extremely small. Color white, with long straight hair. Larger than the common goat. Ranges from forty to sixty-five parallels.

Genus Antilope, *Smith.* Horns compressed, placed beneath the frontal crest, round or compressed; chin beardless. Body slender, standing high on the legs, with a general resemblance to that of a deer.

A. americana. Prong-horned Antilope. (Godman, Vol. 2, plate. Richardson, pl. 21.) Horns compressed, black, tapering, curved inwards towards each other; a small snag or antler at about one-third of its height, projecting forwards. *Plains of Missouri.*

(fossil.)

O. mammilaris. (Kirtland, Am. Jour. Vol. 31, p. 82, plate.)

FAMILY VI. CERVIDÆ.

Horns solid, deciduous, (in most of the genera, in the male only.) No incisors above, eight beneath. Occasionally canines above. A sub-orbital sinus, or glandular cavity at the inner angle of the eye; pupils elongated. Tail short. Legs slender. Feet bisulcated.

Obs. This family, which is founded on the old linnean genus Cervus or Deer, now comprises forty-five real or nominal species, distributed, according to the ideas of systematic writers, into eight or ten genera. But six species are found within the United States, and of these, three only exist in the State of New-York.

GENUS CERVUS.

Horns always present in the males, branched, sub-palmated or simple; the horn arising rounded from a burr or rose-shaped base. Ears large. Mammæ four, inguinal. No canine teeth. A muzzle. Tail short, bushy.

THE AMERICAN DEER.

CERVUS VIRGINIANUS.

PLATE XXVIII. FIG. 1.

Dama virginiana: RAY, Syn. Quad. p. 86. F. CUVIER, Mamm. lithog. plate.
Cervus virginianus. HARLAN, Fauna Amer. p. 239. GODMAN, Am. Nat. Hist. Vol. 2, p. 306, plate.
Mazama id. HAMILTON SMITH, Griffith's Cuv. Vol. 4, p. 127, and Vol. 5, p. 315.
C. (Mazama) mexicanus et *clavatus.* HAMILTON SMITH, Ib. p. 315.
Fallow Deer. EMMONS, Mass. Report, 1840, p. 81.

Characteristics. Reddish or bluish grey, according to the season. Young, spotted with white. Horns moderate, curving forward, with the concave part in front, with from one to six points, occasionally palmated.

Description. Head long and slender. Muzzle pointed. Eyes large and lustrous, the lachrymal pits consisting of a slight fold of the skin. Tail moderate, depressed. Legs slender. A glandular pouch concealed by a thick tuft of rigid hairs inside of the hind legs, odoriferous, and connected with the sexual appetite. The horns of the adult male vary so much in shape, that scarcely any two are alike; appearing to depend upon age, season, and abundance or scarcity of food. In the first season they are simple, cylindrical and pointed, and in this state they are known as *spike bucks*; in the following season, they have a short, straight antler; and the number increases until the fourth season, when the following is the most usual condition of the horns: The main stem rises upward and laterally, and then makes a broad curve forward, with the tips turned inward and downward; on the inner and slightly anterior surface of the main stem, arises a short brow antler, directed forward and upward; the stem, thus

far, is roughened by nodosities and furrows; above this, a branch is thrown off from the interior or anterior, curving inwards and forwards, and occasionally another branch before reaching the tip. These first and second branches are occasionally themselves bifurcated; and in one before me now, the horns exhibit six tips on one side, including those of the brow antlers, and on the other nine, the first branch being bifid, the second trifid, a third simple, and the extreme tip itself bifid. When the horn is palmated, the flattening occurs at the origin of the first branch. In many specimens, there is only the brow antler, and a single branch above. Fur composed of flattened angular hairs, lying smooth on the body.

Color. Bluish grey in the autumn and winter, dusky reddish or fulvous in the spring, becoming bluish in the summer. The fawns are irregularly spotted with white. The grey or reddish color in the adult extends over the whole head, back, sides, and upper part of the tail; a few white hairs often observed on the rump, at the origin of the tail. Beneath the chin, throat, belly, and inside of legs and under side of tail, always white. Ears margined with dark brown, and often with white hairs within, and a white circle round the eyes. Hoofs jet black.

Total length (average), ...	68·0.
Length of tail (including hairs),.....	6·0.
Height of ear,.....	4·0.

This well known animal is still found in almost every part of the State, where there is sufficient forest to afford them food and cover. From the mountainous regions of Orange, Rockland and Delaware, the city market is supplied in great abundance during the winter. In the most northerly counties, they are not numerous; and in other counties, the united attacks of men and wolves are daily decreasing their number. Under the article *Wolf*, we have shown how destructive the wolves are to deer. In some insulated districts, as on Long Island, where the wolf has been extirpated, and the deer are placed under the protection of the laws during the breeding season, although more than a hundred are annually killed by sportsmen, yet it is believed that their number is actually on the increase.*

The Deer has one and occasionally two fawns at a birth, which in the southern part of the State occurs in May or June; in the northern districts, somewhat earlier. In the rutting season, the males are restless and bold, and are observed to have the neck considerably swelled. When alarmed, they stamp quickly and often on the ground, and emit a sound like a shrill whistle, which may be heard at a great distance. When mortally wounded, they often give a faint bleat like that of a calf. When brought to bay, it throws off its habitual timidity, its eyes glare fiercely around, every hair on its body bristles up and appears as if directed forward, and it dashes boldly upon its foe. Its horns are cast usually in the winter, but the

* By the present law of the State, deer are only permitted to be killed between the first of August and the first of January ensuing. So many does, however, have been lately killed, with young in December, in the southern parts of the State, that at this session (1842) the project of a law has been introduced, to allow deer to be killed in certain counties only in the months of September, October and November.

period appears to depend much on the latitude, mildness or severity of the season. While growing, the horns are covered with a velvet-like membrane, which peels off as soon as they have attained their growth. It has often been a matter of surprise, that while so many horns are annually cast, so few are ever found. This is to be explained by the fact, that as soon as shed, they are eaten up by the smaller gnawing animals. I have repeatedly found them half gnawed up by the various kinds of field mice so numerous in our forests.

The Deer is an exceedingly useful animal, not only as furnishing an excellent article of food to the settlers in frontier counties, where it would be impracticable to obtain any other meat, but also as furnishing the buckskin of commerce. It feeds on buds and twigs of trees, shrubs, berries and grasses. It appears to be particularly fond of the buds and flowers of the pond-lily.

It ranges from Canada to the Gulf of Mexico, and probably still farther south. I saw two deer alive from Campechy, which were exhibited as Mexican deer, but offered no distinctive characters from those of our common deer. It is found throughout the west to the Rocky mountains. It does not appear to extend into Canada.

THE MOOSE.

CERVUS ALCES.

(PLATE XXIX. FIG. 2)

Cervus alces. LIN. 12 Ed. p. 92.
Moose Deer. PENN. Arct. Zool. Vol. 1, p. 17, pl. 8.
C. alces. HARLAN, Fauna, p. 229. GODMAN, Am. Nat. Hist. Vol. 2, p. 274, figure.
American Black Elk. Griffith's Cuvier, Vol. 4, p. 72. Plate of Heads.
The Elk. HAMILTON SMITH, Ib. Vol. 5, p. 303.
Moose Deer. RICHARDSON, F. B. A. Vol. 1, p. 232.
Moose. EMMONS, Mass. Report, 1838, p. 28; for 1840, p. 74.

Characteristics. Blackish grey. Adult male with broad flattened horns. Snout long, prehensile. Neck with a mane. Size of a horse, and largest of the genus.

Description. Stature large. Head long, somewhat narrowed before the eyes, then enlarged into a thick curved nose; the muzzle small. Nostrils long, narrow, enlarged beneath. Eyes moderately large, and placed near the base of the horns; lachrymal pit small. Ears long and asinine. Neck very short, and furnished with a short mane. A tuft of long coarse hair like a beard beneath the throat in both sexes; in the young, this appears like a pendulous gland. Horns in the male only. The first year, it exists in the shape of a short knob, not more than an inch high; in the following year, it is a round spike, slightly directed outwards, and about a foot long; in the third year, they begin to branch forward, and to become palmated above. In full grown adult males, the palmated portion ends in from five to eight short tips; and the brow antlers, if present, are round and pointed, directed forwards, and occasionally bifid or even trifid. Hair coarse and angular, longer upon the neck and withers.

Color. Generally fulvous brown on the upper part of the body, and on the head and sides; this color extends to the upper part of the thighs and fore legs, occasionally extending further down. Ears greyish or dingy white within. Body beneath light colored, with a slight tinge of yellow or soiled white; under side of tail white. In winter, the head, neck and all the upper parts of the body quite dark. Young, sandy brown, unspotted; and this color deepens with age, so that in very aged individuals the color is almost black.

Total length, 6 to 7 feet.	
Length of tail,	10·0 – 16·0.
Height at the withers,	48·0 – 65·0.

The Moose, in its ungainly form and awkward movements, presents a singular contrast to the elegance and graceful motions of the other members of its family. It is known with us under the various names of *Flat-Horned Elk*, *Black Elk*, *Moose*, and *Black Moose;* the name *moose* being a corruption of the Indian appellation *musee*, or *wood-eater*. In the earliest history of our State, the following allusion is made to this animal: "There is also another "kind, which are represented to be large, and about which strange stories are related. I "heard from the mouth of a jesuit who had been taken prisoner by the Mohawk Indians, that "there were many wild forest oxen in Canada and Nova-Francia, which in latin they named "*Boves sylvestres;* as large as horses, having long hair on their neck like the mane of a horse, "but with cloven hoofs, and their habits were not fierce." (*Vanderdonck.*)

In conformity to the doctrine held by many modern naturalists, that few if any quadrupeds are common to the two continents, it has been doubted whether this species is identical with the *C. alces*, or Elk of Europe. I have not had the opportunity, by direct comparison of specimens from both continents, to determine this question; but a careful examination of the descriptions of European writers, with my notes taken many years since from specimens in the collections of Paris and Berlin, satisfies me of their specific identity. Hamilton Smith, whose opportunities for examining our Moose were very great, observes, that "the almost complete "separation of the lower part of the horns into the form of branches, in most if not all the "American specimens, is a very prominent character, while a similar conformation is rare in "those of Europe." In the valuable collection of the Lyceum of Natural History of New-York, are several horns of this species, all without the lower antlers. One pair, which is attached to the skull, and which from its size probably belonged to an aged moose, is equally destitute of lower antlers. This pair is four feet across from tip to tip; the palmated part is thirty inches wide, measured in an antero-posterior direction.

In the summer, the Moose frequents the neighborhood of lakes and streams, frequently swimming in the water, and feeding upon aquatic plants, among which the roots of the pond-lily appear to be most greedily devoured. It also feeds upon the high coarse grasses, twigs of trees, more especially of the striped maple (*Acer striatum*, Pursh), which has consequently received the name of *Moose-wood*. It likewise peels old trees, and feeds upon the bark. Period of gestation, nine months; and it produces one or two at a birth, in April or May.

In winter, the moose herd together for mutual protection, selecting hilly woods, and feeding exclusively on young twigs and the moss and bark of trees. These herds consist of a bull, a cow and two calves; sometimes four or five cows, but this is more rare. Occasionally several of these herds unite, and when the snow lies deep, they will tread down a space of several acres, which are termed by the hunters *moose-yards*. At this season, and in such situations, the hunter attacks them most successfully.

They are yet numerous in the unsettled portions of the State, in the counties of Essex, Herkimer, Hamilton, Franklin, Lewis and Warren; and since the gradual removal of the Indians, they are now (1841) believed to be on the increase. They have been extirpated from Massachusetts, but are still found in Maine, Vermont and New-Hampshire. Godman has erroneously stated that they are not known south of Maine; and this error has been magnified by subsequent copyists, who assert that it is not found in the State of Maine. It existed formerly much nearer the Atlantic coast; for we learn from Dunlap, that a pair of moose were once sent from Fisher's Island to England.

The Moose is a timid, wary animal; and its senses of hearing and smelling are so acute, that it requires the greatest caution on the part of the hunter to approach it. During an expedition of several weeks through the counties of Hamilton, Franklin and Essex, although their tracks were almost daily visible, yet we never had an opportunity of shooting a single individual. A specimen was sent to me from Lewis county, but unfortunately never reached its destination.

The moose furnishes an excellent material from its hide for moccasins and snow-shoes. The best skin is obtained from the bull moose in October, and usually sells for four dollars. They were formerly so numerous about Raquet lake, that the Indians and French Canadians resorted thither to obtain their hides for this purpose; and hence we have the origin of the name of that lake, the word *raquet* meaning *snow-shoes*. They still exist in its neighborhood.

The moose, when pursued, trots off with great rapidity, but in an awkward manner, its hoofs at the same time making a cracking noise. At this gait it soon leaves the hunter far behind, stepping with great ease over fallen timber of the largest size. When hard pressed by the hunters on snow-shoes, if it breaks up into a gallop, they are sure of overtaking it soon. Its flesh is much esteemed, and the meat of the young can scarcely be distinguished from the best veal. The nose and tongue are particularly considered great dainties. The moose, when taken young, is easily domesticated, and has been used in this State for draught. I am not aware, however, that they possess any advantage for such purposes over our common beasts of burden; and their preference for twigs and bark of trees, instead of grasses, would render them not very desirable to the farmer who cared for the growth of his plantation.

The Moose inhabits the northern parts of both continents. In America, they range to the Arctic Sea; and I am enabled to state, from personal knowledge, that their extreme southern limit along the Atlantic coast is 43° 30′ in the State of New-York.

(*EXTRA-LIMITAL.*)

C. macrotis. (RICHARDSON, pl. 20.) Greyish, with a black tipped tail; ears large; horns with three branches; forehead dark brown. About the size of the Common Deer. *Plains of Missouri.*

C. leucurus. (RICHARDSON, p. 258, not figured.) Reddish brown in summer, light grey in winter. Tail long, white beneath and at tip. Size of Common Deer, to which it is closely allied. *Rocky Mountains.*

C. nemoralis. (SMITH, Griffith's Cuv. Vol. 4, plate.) Greyish brown tinged with yellow; forehead and nose black. Horns branched at tip, the anterior branch curved forward like a hook. *Louisiana.*

GENUS ELAPHUS.

Horns in the male only; round, very large, never palmated, furnished with a distinct muzzle. Canine teeth in the males in the upper jaw, sub-orbital; sinus large.

THE AMERICAN STAG.

ELAPHUS CANADENSIS.

PLATE XXVIII. FIG. 2.

Cervus canadensis. RAY, Synops. Quad. p. 84.
C. strongyloceros. SCHREBER, Saugethiere, Vol. 2, p. 1074, pl. 247, F. G.
Alces americanus. JEFFERSON, Notes on Virginia, p. 77.
Elk. SMITH, Med. Repos. Vol. 2, p. 157, figure. (Male, female, young.)
C. wapiti. BARTON, Med. and Phys. Jour. Vol. 3, p. 36. FRED. CUVIER, Mamm. Vol. 2. Male (winter dress)
C. canadensis. HARLAN, Fauna, p. 236. GODMAN, Vol. 2, p. 294, figure. (Male.)
Wapiti. Griffith's Cuvier, Vol. 4, p. 96, plate (male); and Vol. 5, p. 309.
C. strongyloceros. RICHARDSON, F. B. A. Vol. 1, p. 251.

Characteristics. Grey, with a large pale yellowish spot on its rump. Horns large, with large brow antlers. Tail very short. Larger than the common deer.

Description. Body robust, symmetrical, slightly more elevated at the withers than on the hind quarters. Height at the foreshoulders varying from four feet to four feet eight inches. Sub-orbital sinus with a naked triangular space around it. Muzzle broad and black. Ears large and white within. Males with canine teeth in the upper jaw. On the foreshoulder, a short rudimentary mane. Under the throat, there is a sort of dewlap, composed of black hair from four to six inches long. Horns large, with the brow antlers nearly or quite in the direction of the facial line. Females without horns or dewlaps; the tail in both sexes very short.

Color. The variation produced by age or sex is but slight. In the spring, it is of a reddish hue, changing as the summer advances to a yellowish brown; in the autumn, this changes to a buff color, which becomes grey in winter. The rump is pale fawn or yellowish, circum-

scribed by a dark circular marginal line. Limbs on the anterior part deep brown. Chin light-colored. Tail yellowish.

Total length,	84·0 – 90·0.	Length of tail,	2·0 – 4·0.
Length of head,	24·0.	Height,	52·0 – 56·0.

The American Stag has long been confounded with the Stags of Europe. It seems first to have been treated as a distinct species by Ray, in the work cited above. It was then noticed by Jefferson as an elk, but was first fully described and figured by Dr. Smith in the Medical Repository, from living individuals obtained from the State of Maine. It has also, from the popular names applied to it, been confounded with the American Moose just noticed. It is called in various parts of the country, *Red Deer*, *Stag*, *Grey Moose*, *La Biche*, *Wapiti*, *Grey Elk*, and *Round-horned Elk*.

It is surprising that for so large, and in some districts so common an animal, so little is known of its habits. They feed on grass and the young shoots of trees, and are represented as being easily tamed, and have been trained to go in harness. Hearne observes that they are the most stupid of the deer kind, and make a shrill whistling noise, not very unlike the braying of an ass. Other writers, however, represent them as exceedingly astute and wary, exercising great sagacity to avoid the snares of the hunter.

Major Smith, in Griffith's Cuvier, has given the fullest account of the American Stag; but there are a few inaccuracies in that description, which it may not be improper to notice. He describes the horns of a specimen shot on Long Island, with six antlers each, and measuring three feet in length. My friend T. Floyd Jones, Esq., living at Oysterbay, Queens county, has had in his possession for many years a very large pair, sent to him from the west, and it is possibly to these that Major Smith alludes; but there is not even traditionary evidence of its having existed on Long Island since its first settlement by the Europeans.

The Stag is still found in the State of New-York, but very sparingly, and will doubtless be extirpated before many years. Mr. Beach, an intelligent hunter on the Raquet, assured me that in 1836, he shot at a stag, (or as he called it, an elk,) on the north branch of the Saranac. He had seen many of the horns, and describes this one as much larger than the biggest buck (*C. virginianus*), with immense long and rounded horns, with many short antlers. His account was confirmed by another hunter, Vaughan, who killed a stag at nearly the same place. They are found in the northwestern counties of Pennsylvania, and the adjoining counties of New-York. In 1834, I am informed by Mr. Philip Church, a stag was killed at Bolivar, Allegany county. My informant saw the animal, and his description corresponds exactly with this species.

FOSSIL STAG.

ELAPHUS AMERICANUS.

PLATE XXIX. FIG. 1. TOOTH, NATURAL SIZE; HORNS AND POSTERIOR PARTS OF SKULL REDUCED.

Fossil Deer. WISTAR, Am. Trans. Vol. 1, p. 377, New Series, pl. 10, fig. 4.
Cervus americanus. HARLAN, Fauna Americana, p. 215.
Fossil Deer. EMMONS, Mass. Report, 1840, p. 82.

In the Cabinet of the Lyceum of Natural History, New-York, is a portion of a pair of horns attached to a fragment of skull, dug up near the mouth of the Raquet river in this State, near the forty-fifth parallel of latitude. It bears a label in the handwriting of Dr. Mitchill, purporting that it belonged to the *C. tarandus*, or Rein-deer. Its size and appearance indicates a nearer affinity to the *E. canadensis*, or Stag just described. The following comparison was made of this fossil with a gigantic pair of horns of the *E. canadensis*, in the Cabinet of the Lyceum. These latter measured three feet five inches across from tip to tip, and two feet ten inches high from burr to tip in a straight line.

	FOSSIL.	RECENT.
Distance from between the horns to the occipital ridge,	4·1	4·8
Breadth of cranium behind the horns,	4·5	4·6
Ditto above the condyloid processes,	6·0	6·0
Depth across the occipital foramen,	4·4	4·5
Circumference of horn above the burr,	9·6	9·0
From tip to tip, compared with corresponding points on the recent specimen,	40·0	44·0

In the fossil, the horns present the same grooved and ridged appearance as in the American Stag; they rise outward, upward, and slightly backward, then forward and upward. Indications of one or two antlers are evident. The figure in the plate will give a better idea of the appearance and direction of the horns, than a detailed description. Through the carelessness of the engraver, the posterior view of the skull is represented as being of the natural size.

I am unacquainted with the circumstances under which this skull was found, but have ventured to arrange it provisionally with the bones described by Wistar and Harlan in the work cited above. Dr. Emmons has described a tooth, taken from a clay bed in Chautauque county in 1839. It is an old tooth, and is the last on the right side of the upper jaw. Through the kindness of Dr. Emmons, I have been permitted to give a figure of the tooth. The following are its dimensions:

Depth,	1·3.
Transverse diameter of the crown,	1·5.
Shortest diameter,	1·2.

The surface of the crown is too much injured, to enable me to render it with perfect accuracy. I learn that other teeth from the same locality, but larger, are in the Cabinet of Yale College.

I regret that I have had no opportunities of making a direct comparison of this tooth with that of the American stag. A horn of the second year's growth was thrown out by a plough on Grand Isle, which is now in the Cabinet of the University of Vermont, which we also refer to the same species.

DIMENSIONS.

From tip to base in a straight line,	28·50.
Ditto ditto, measured along the curve,	33·50.
Circumference just above the tuberosities,	7·25.
Ditto at the highest part of the curve,	4·50.
Ditto at five inches from the tip,	3·25.

Dr. Emmons appears disposed to consider the relics in question as having belonged to a larger animal than the American Stag, and analogous to the Irish Elk; this, however, is merely offered as a conjecture. In the present imperfect state of our knowledge, I view it as a distinct species, closely allied to the *E. canadensis*.

GENUS RANGIFER.

Horns in both sexes. Canine teeth in both sexes. Muzzle small. Horns slender, smooth, palmated. Sub-orbital sinus.

THE REIN-DEER. (*Extirpated?*)

RANGIFER TARANDUS.

(MEDICAL COLLEGE, ALBANY.)

Cervus tarandus. LIN. Syst. p. 93.
Caribou of the old French writers.
C. tarandus. HARLAN, Fauna Americana, p. 232. GODMAN, Am. Nat. Hist. Vol. 2, p. 283, plate. RICHARDSON, F. B. A. Vol. 1, p. 238, figures. EMMONS, Mass. Report, 1840, p. 78.

Characteristics. Varying in color from deep brown to greyish white. About the size of the common deer.

Description. Body robust, and low on the legs. Snout thin, with oblique nostrils. Ears large. Horns usually slender, very variable in form: They generally consist of brow antlers, which are palmate and digitate; the main stem directed backward, then curving forward, with simple or palmated antlers, or else terminating in a broad palmated expansion, which is often furnished with points. Legs robust. Hoofs rounded, consisting of a single plate folded on itself, very broad, with a strong fringe of hairs around it. Fur close and compact, but composed of two portions, one woolly, the other longer, straight and brittle.

Color. Varying with age and season. Young, brownish above, with a tinge of reddish beneath. Adults, in the summer, in a smooth coat of greyish brown, becoming rougher and whiter in winter. Beneath, the throat, belly and insides white at all seasons.

It is with much hesitation that I include this animal in the Fauna of our State; but the representations of hunters lead me to suspect, that when the yet unexplored parts of the State have been more thoroughly examined, its existence may be disclosed. Pennant, in his time, asserted that the Rein-deer was not found farther south than the most northern part of Canada. Charlevoix, however, saw one killed at Quebec. The specimen in the cabinet of the Medical College at Albany came from Nova-Scotia; and Harlan asserts that it does not pass the State of Maine into the United States, implying its existence there. Prof. Emmons observes, "It is only a few years since this animal appeared in the northern parts of Vermont "and New-Hampshire; from which it is not unreasonable to infer, that in earlier times it may "have passed still farther south." Its gregarious habits and unsuspicious character would seem to ensure its speedy destruction, when placed within the reach of man.

ORDER VII. CETACEA.

Body shaped like a fish. Fore feet two, in the shape of fins. In place of hind feet, there is a broad horizontal fin. Ears consist of a minute exterior opening. Without hair, or a few scattering ones only. Live exclusively in the water, only coming out to breathe. Gregarious.

This order comprises whales, porpoises and dolphins, generally considered by uninstructed observers as fishes. It is divided by Cuvier into two great sections, the Herbivorous and Piscivorous. In the first we find the

FAMILY I. MANATIDÆ.

With two kinds of teeth in the young. Molars with flat crowns. Nostrils placed near the end of the muzzle, in the skin. Long whiskers. Teats pectoral. No spiracle. Scattering short hairs over the body.

Obs. This family comprises about five living species, one of which is found near our shores, but none within the limits of this State.

(*EXTRA-LIMITAL.*)

Genus MANATUS. Grinders eighteen above and eighteen below; the upper square, the lower longer than wide, all with two transverse ridges and a heel, becoming larger on the lower posterior ones. Pectoral fins with vestiges of nails at their edges. Body ending in a rounded caudal fin.

M. americanus. (Pl. 30, fig. 2, A, B; and Pl. 32, fig. 4, Skull.) Body elliptical; snout truncated; skull elongated in proportion to its breadth; lower edge of the lower jaw straight. Tail rounded. Length 10 – 20 feet. *Florida.*

The Manati is still hunted for its flesh, among the keys and lagoons scattered along the southern part of the peninsula of Florida. They are struck with the harpoon. The largest of which I have heard any account, weighed more than a ton. The flesh is highly prized as a savory and nutritive food. The New World of October, 1841, contains an interesting account of the habits of this species; the female is described as having a teat under each swimming paw. Through the politeness of Mr. Bell, I have been permitted to make the following observations on the skull of the Manati, which died a few months after I had drawn up the description cited above. It was a young animal, as was manifest by the existence of the sockets of the incisors in the intermaxillaries of the upper jaw. There were five prominent molars on each side, gradually enlarging behind, and then not yet extruded. In the lower jaw, the teeth were similar in number and position. The curve of the lower jaw (see figure) is nearly as great as in the Senegal species, and almost equals that of the *latirostris.*

M. latirostris. (HARLAN, Med. and Phys. Res. p. 71, plate.) Lower edge of lower jaw curved; snout very wide before the eyes. Length 8 – 10 feet. *Florida.*

M. giganteus. Fossil. (ID. Ib. Vol. 20, p. 385.) Western shore of Maryland.

Genus ZEUGLODON, *Owen.* (Fossil.) Twelve molars in the upper jaw; in the lower, ——. Teeth with double fangs and a horizontal section of the crowns, suggesting the idea of two teeth tied or yoked together; hence the generic name.

Z. harlani. (OWEN, Geol. Soc. Lond. 1838; Loud. Mag. 1839, p. 209. *Basilosaurus,* HARLAN, Am. Phil. Soc. 1834; Med. and Phys. Res. p. 349.) From eighty to one hundred feet long. Occurs in the horizontal limestone of Alabama, the most recent of the cretaceous group; also in Arkansas.

FAMILY II. BALÆNIDÆ.

Teeth none, or only in the lower jaw; when absent, their place supplied above by thin horny plates termed baleen, *or* whalebone. *Skin smooth, and almost entirely destitute of hairs; with a thick mass of fat beneath. Two inguinal teats, placed near the vent. Nostrils assuming the form of spiracles. Gregarious. Piscivorous; often carnivorous.*

OBS. This family comprises the most bulky of created beings. They have a strong external resemblance to fish; and to increase this resemblance, many of them have a callous projection on the back, like a dorsal fin. Upwards of seventeen species have been enumerated by writers, but many of them rest upon uncertain authority. The history of this family

is still enveloped in great obscurity; and their habits, from the nature of the element in which they exist, are little known. They are highly useful to man, producing valuable articles of commerce, and creating an excellent nursery for seamen.

GENUS BALÆNA. *Linneus.*

Head very large. No teeth. Upper jaw furnished with numerous plates of whalebone. Spiracles two, distinct, on the most elevated part of the head, just before the eyes. No dorsal elevation or fin.

THE RIGHT WHALE.

BALÆNA MYSTICETUS.

PLATE XXXI. FIG. 3.

Balæna mysticetus. LINNEUS, Syst. p. 105.
Common Whale. DUDLEY, Phil. Trans. Abridg. Vol. 7, p. 424. SCORESBY, Arct. Reg. Vol. I, p. 449, figure GODMAN, Vol. 3, p. 98.

Characteristics. Black, occasionally varied with white or yellowish. Gape of the mouth arched with about 600 laminæ of whalebone. Length 40 – 60 feet.

Description. Body thickest in the middle, a little behind the fore paws; somewhat furrowed, tapering towards the tail. Head large, somewhat triangular. Opening of mouth large, with a few scattering hairs on the end of the jaws. Eyes very small, and placed near the corner of the mouth. External ear exceedingly minute. Spiracles two, oblong, adjacent, slightly largish in front. Palate and sides of upper jaw with two rows of whalebone from ten to thirteen feet long, and generally curved longitudinally, and giving an arched form to the roof of the mouth. Each series consists of three hundred laminæ or more of whalebone, the interior edges of which are covered with a hair-like fringe. Swimming paws rounded, somewhat pointed, 7 – 9 feet long, with a width of 4 or 5 feet, and situated about two feet behind the angle of the mouth. Tail very broad, notched in the centre, curved on the edges, and pointed at the tips.

Color. Blackish throughout; occasionally with a small space under the body, and a larger space on the lower jaw, whitish grey or flesh color. Very old individuals become varied with white and black, or piebald.

Weight from 60 to 100 tons.

This huge animal is known along our coast by the various names of *True, Right, Common* and *Whalebone Whale.* Of its habits little can be said, except that after a presumed gestation of nine months, it produces one at a birth, which it suckles for about a year. The milk is said to be rich and well flavored. It exhibits great maternal fondness for its offspring, and although at other times remarkably timid, manifests great boldness, and even ferocity, in de-

fending her young. It was formerly found in every part of the ocean in large troops; but since its capture has become an object of commercial enterprise, it has been driven from the shores of Europe and North America, and is now pursued on the coasts of Africa, in the Indian ocean and the Arctic seas. From the structure of its jaws, and the smallness of its throat, it can only feed on the smaller oceanic animals, such as medusæ or sea-jellies, shrimps, crabs, and some minute mollusca. These would at first appear to be insufficient for such huge monsters; but when we examine the waters to which they resort, and which are termed their *feeding grounds*, our wonder ceases. Off the coast of Brazil, I have passed over hundreds of miles where these minute animals were so numerous as to discolor the water, giving it the appearance of wheat scattered over a reddish sand-bank. These are termed by the whalers the *Brazil banks*, and thither they have resorted of late years in pursuit of the whale. Scoresby has estimated, that in similar places in the Arctic seas, twenty-three quadrillions of such animalculæ are distributed over a surface of two square miles.

The whale fishery in this country, as in others, has been pursued with various success, and is even now subject to frequent fluctuations. The first vessel constructed expressly for this fishery, was a small sloop built at Nantucket in 1690. She was merely intended for cruising along shore. In 1715, the number of similar sloops was but fifteen; and from this period it went on increasing up to the war of the Revolution, when it was utterly destroyed by the English.

In 1799,	we employed	26	vessels, of	5055 tons.
1800,	"	17	"	2814 "
1801,	"	15	"	2349 "
1802,	"	20	"	3201 "

Of this last number, only one was fitted out from this State. It appears also that the business fell off very much from 1790 in the succeeding ten years, as may be seen by the following tables:

1791, we exported 134,595 galls. sperm oil;	1802, we exported 28,470 galls. sperm oil;
447,323 galls. whale oil;	379,976 galls. whale oil;
82,400 lbs. sperm candles;	135,637 lbs. sperm candles;
124,829 lbs. whalebone.	80,334 lbs. whalebone.

The Right Whale was formerly captured in great numbers from sloops and whale-boats, along our whole coast, chiefly from February to May, although they appeared occasionally at all seasons of the year. Along the southern coast of Long Island, whale boats are still kept in readiness; and upon the appearance of a whale, the people in the vicinity quickly assemble, and are soon in pursuit of the animal. The whale fishery, which includes not only this species, but also the Sperm Whale, is pursued in its various branches with great success, either by associations or by individuals. Every person employed is a shareholder, and of course this presents an additional motive for exertion. From a record kept at New-Bedford, which we have inserted below, it appears that the whole number of vessels employed in the

whale fishery, in the year ending September, 1839, was 557, making an aggregate of 169,938 tons, which would give employment to 9,987 men, and to as many more on shore, in the various operations of coopering, refining, etc. etc.

PLACES WHERE OWNED.	Ships and barks.	Brigs and schooners.	Pacific.	Indian ocean.	New Zealand.	South Atlantic.	Atlantic.	In port.	Whole number.	Amount of tonnage.
New-Bedford,	69	8	70	31	27	12	10	27	177	56,118
Fairhaven,	13	1	13	13	7	5	1	5	44	13,274
Dartmouth,	3	....	3	....	....	....	....	....	3	874
Westport,	5	4	....	1	....	....	7	1	9	1,443
Wareham,	2	2	1	....	....	1	1	1	4	904
Rochester,	5	10	....	1	1	....	11	2	15	2,615
Nantucket,	77	4	60	....	3	....	3	9	81	27,364
Edgartown,	8	....	4	....	2	....	1	1	8	2,659
Holmes Hole,	3	1	....	2	....	....	1	1	4	1,180
Fall River,	1	3	1	....	1	1	1	3	7	1,604
Lynn,	1	....	....	3	....	....	....	1	4	1,269
Newburyport,	3	....	....	2	1	....	....	....	3	1,099
Plymouth,	3	....	....	1	....	2	....	....	3	910
Salem,	11	....	2	11	1	....	....	....	11	4,265
Boston,	....	1	....	....	....	1	....	....	1	125
Dorchester,	2	....	2	....	....	....	....	....	2	581
Falmouth,	8	....	8	....	....	....	....	....	8	2,490
Provincetown,	....	1	....	....	....	1	....	....	1	172
Portland,	1	....	1	....	....	....	....	....	1	388
Wiscasset,	1	....	1	....	....	....	....	....	1	380
Portsmouth,	1	....	....	1	....	....	....	....	1	348
Newport,	9	2	5	....	....	3	....	3	11	3,152
Bristol,	5	1	3	....	....	1	1	1	6	1,782
Warren,	18	5	5	2	4	5	1	4	21	6,075
Providence,	3	....	1	....	1	1	....	....	3	1,086
New-London,	30	9	1	13	6	15	....	4	39	11,417
Stonington,	7	5	2	3	1	6	....	....	12	1,912
Mystic,	5	3	....	1	....	7	....	....	8	1,797
Sag-Harbor,	31	....	18	....	3	14	....	2	31	10,605
Greenport,	4	1	1	....	....	4	....	....	5	2,014
New-Suffolk,	1	....	....	....	....	1	....	....	1	274
Jamesport,	1	....	....	....	....	1	....	....	1	236
Bridgeport,	3	....	....	....	....	2	....	1	3	913
New-York,	3	....	....	....	....	1	2	....	3	710
Hudson,	8	....	1	4	....	....	....	3	8	2,902
Poughkeepsie,	6	....	4	....	1	....	....	1	6	2,043
Cold Spring,	2	....	....	....	....	2	....	....	2	629
Wilmington,	5	....	2	....	....	....	....	3	5	1,578
Newark,	1	....	....	....	1	....	....	....	1	366
Total,	498	50	209	89	60	86	40	73	557	169,983

The amount of whale and sperm oil and whalebone introduced into the United States, and the total value of the same at estimated average prices from actual sales during the four years preceding 1839, is as follows :

In 1835,	$6,168,997 00
In 1836,	5,689,814 00
In 1837,	7,357,553 00
In 1838,	6,156,038 00

In this State, the whale fishery has been successfully pursued. From returns obligingly communicated to me by the Collector of the Port of New-York, it appears that within the past year (1838) sixteen vessels of 5538 tons and 320 men, were employed from that port in the whale fishery. The produce was,

Sperm oil, ..	177,346 galls.	Value,	$181,421 00
Whale oil, ..	605,497 galls.	"	209,438 00
Whalebone, .	186,448 lbs.	"	32,124 00
		Total value,	$422,983 00

From the Collector at Sag-Harbor for the same period, I have received the following statement:

Sperm oil, ..	125,240 galls.	Value,	$125,240 00
Whale oil, ..	959,295 galls.	"	319,760 00
Whalebone, .	236,000 lbs.	"	42,480 00
		Total value,	$487,485 00

From another source, we gather the following information connected with the whale fishery from one district alone in this State. It is the district which comprises the three counties of Kings, Queens and Suffolk, on Long Island.

During the year ending December 31, 1840, there arrived within that district, between the second of May and the twelfth of October, nineteen vessels, with the following gross amount:

Sperm oil,	109,588 galls.
Whale oil,	937,234 galls.
Whalebone,	232,182 lbs.,

valued at something over half a million of dollars.

During the year 1840, between June 16 and December 20, there sailed from the same district twenty vessels. Their destinations were, fourteen for the South Atlantic Ocean; two for the Indian Ocean; and for New-Holland, New-Zealand, Crozett Islands and the North-west Coast, one each. On the first of January, 1841, there were still absent, in addition to the foregoing, nineteen vessels, all on voyages to the Indian Ocean and New-Zealand. These had departed between the twelfth of June, 1838, and the twenty-sixth of August, 1839. Several of them, however, arrived within the present year. The average duration of those whalers which returned in 1840, was short of sixteen months.

Those vessels employed in the right whale fishery, are absent on an average twelve months. In pursuit of the spermaceti whale, the duration of the voyage often extends to three years.

From more recent information, we are enabled to state, that at the close of the year 1841, our whaling squadron, out of all the States, amounted to 650 sail of all classes, presenting an aggregate tonnage of 190,374, and employing 13,500 men in the actual prosecution of their voyages.

GENUS PHYSETER. *Gmelin.*

Head enormously large, truncated in front. Twenty or more stout, conical, subequal teeth on each side of the lower jaw, rudimentary above. Spiracles united into one, near the end of the jaw.

This genus is remarkable, not only for its bulk, but for the valuable article of commerce, termed *spermaceti*, which is found chiefly in large cells in the upper part of the head. Seven species have been enumerated by compilers, but we shall follow Cuvier in considering but one species as yet sufficiently identified. We prefer retaining the original name of *Physeter*, to the barbarous provincial epithet of *Cachalot*.

THE SPERM WHALE.

PHYSETER MACROCEPHALUS.

PLATE XXXI. FIG. 2.—(JAWS IN THE CABINET OF THE LYCEUM.)

Cachalot macrocephale. LACEPEDE, Hist. Nat. Cet. pl. 10, fig. 1.
Physeter macrocephalus. SHAW, Gen. Zool. Vol. 2, p. 49.
The Spermaceti Whale. Naturalist's Library, Vol. 6, p. 154.

Characteristics. Black or darkish above; throat and beneath, silvery grey. A very small dorsal elevation towards the tail. Length 60 – 80 feet.

Description. Head forming one-third of its bulk; its anterior part truncated or obtuse, overhanging the lower jaw. Eyes small, and said to be unequal. Spiracle shaped like the letter *f*, on the anterior part of the head, in the centre of an elevated protuberance. Swimming paws short, obtusely pointed. Openings to the ear sufficiently large to admit a small quill. Teeth in the lower jaw conical, pointed, not acute; in some individuals, amounting to twenty-seven. In the upper jaw there are also teeth, but very small and rudimentary. The lips overhang and conceal the opening of the mouth.

Color. Generally brownish black or jet black, somewhat lighter on the sides, and beneath a silvery grey. There is often a considerable variety in their markings, but the old males are generally light grey on the anterior part of the head.

The Sperm Whale is gregarious, and often found in herds of from two to five hundred. They are said to feed on fish, and a species of sepia or cuttle-fish. Although they resort to the same feeding grounds with the Right Whale, it is not probable that, with their large teeth and powerful jaws, they subsist on the same minute food. The sperm oil is found in great

abundance in a large cavity in the upper part of the head, above the brain. It is also obtained from the blubber, which varies in thickness from eight to fourteen inches. A moderate sized whale will yield fifty to eighty barrels. In a few rare cases, we have known them to furnish one hundred and twenty barrels.

Although a timid animal, the Sperm Whale will sometimes turn with fury upon its pursuers, and destroy boats and men. Upon one occasion, a large whale attacked the whale-ship Essex, stove in its bows, when she filled and sunk; the crew took to the boats, and after unheard of suffering, landed on the coast of Peru; three only of the crew survived.

The Sperm Whale was formerly numerous on our coast, where it is still occasionally captured. Sixty years ago, the pursuit of the whale was considered so characteristic of American hardihood and enterprise, as to have elicited from the English orator BURKE the following eloquent tribute: "While we are carrying on the whale fishery under the arctic circle, we hear "that they have pierced into the opposite region of polar cold; that they are at the antipodes, "and engaged under the frozen serpent of the south. Falkland Island, which seems too remote "and too romantic an object for the grasp of national ambition, is but a stage and resting place "for their victorious industry. Nor is the equatorial heat more discouraging to them than the "accumulated winter of both poles. We learn that while some draw the line or strike the "harpoon on the coast of Africa, others run the longitude, and pursue their gigantic game "along the coast of Brazil. No sea but what is vexed with their fisheries; no climate that "is not witness of their toil. Neither the perseverance of Holland, nor the dextrous and firm "sagacity of English enterprise ever carried this most perilous mode of hardy industry to the "extent to which it has been pursued by this recent people; a people who are still in the "gristle, and not hardened into manhood." Since that period, how extended the field of our labors! The broad Atlantic has become too limited an arena for exertion. A new antarctic continent has been discovered and coasted, among the thick-ribbed ice. The Gallipagos, New-Zealand, the Coast of Japan, are but resting places, and the farthest limits of ocean only, bound the ardor of our daring navigators.

GENUS RORQUALUS. *Knox.*

Head not disproportionately large. Jaws somewhat pointed, and rostrated. An acute protuberance on the back, resembling a dorsal fin. No teeth. Short baleen in the upper jaw. Deep folds on the throat and abdomen.

THE BEAKED RORQUAL.

RORQUALUS ROSTRATUS.

PLATE XXX. FIG. 1.

Balæna rostrata. FABRICIUS, Faun. Grœnland. p. 40.
Balænoptera acuto-rostrata. LACEPEDE, Cet. p. 134, pl. 4.
B. rostrata. SCORESBY, Arct. Regions.
Rorqualus minor. KNOX, Nat. Lib. Vol. 6, p. 142, pl. 7.

Characteristics. Bluish black; greyish white beneath, with numerous flesh-colored folds on the throat and belly. Baleen white, divided into 320 plates on each side. Vertebræ 48. Length 16 – 25 feet.

Description. Body cylindrical, and gently tapering from the swimming paws to the head and tail; towards the tail the body becomes much compressed, and forms a ridge which runs a few inches on the tail. Head smaller than the body, long, narrow and pointed; the outline of the head separated from the dorsal outline by a slight depression. The upper mandible, from the commencement of the baleen, is 42·0 long, and 4·0 shorter than the lower, into which it is received; furnished with baleen of a whitish color, which has a hoary appearance on its fringed edges. The laminæ, as nearly as could be ascertained by repeated countings, amount to three hundred and twenty on each side; they were of various lengths, from two to eleven inches, gradually increasing from the snout posteriorly. The spiracles two, placed at the extremity of the ridge on the upper jaw, a little forward of a line drawn upwards from the eyes: They are 7·0 long, and gradually approach each other to within 0·75 in front; posteriorly they are 3·0 apart, and are separated from each other by a deep furrow 9·0 long. Lower jaw acute, rather stouter, and 4·0 longer than the upper. Eyes large, but appear small, as they are much covered by the eyelids; a deep furrow above and beneath, placed above and near the angle of the mouth. The ears not visible, but their situation is determined by a very slight change in the appearance of the skin, which yields rather more than the surrounding parts to pressure; they are about 5·0 behind and a little below the eyes. Tongue large, free and very fat; beneath it the skin of the throat is very dilatable. Roof of the mouth smooth. No vestige of a tooth could be seen or felt in the lower jaw. Swimming paws 25·0 long, oblong, tapering, and attached vertically to the body about two-thirds of the distance from the dorsal protuberance to the angle of the mouth. (In the figure this is incorrectly given.) Dorsal eminence leathery, elastic, triangular, a foot high, broad at the base, and placed above the vent. Tail horizontal, bilobate, its tips pointed. Chin and throat with numerous furrows 0·5 to 1·0 deep, extending some distance over the abdomen, and presenting a waved appearance on the chin and throat.

Color. Bluish black above, pearly white beneath, but this has changed to a faint pink, especially in the furrows, owing, I imagine, to the settling of the blood in those parts. Lips white. Swimming paws white in the middle, black at the base and extremities. Under side of the tail whitish.

Dimensions. Total length eighteen feet. From the posterior fold of the swimming paw to the notch in the middle of the tail, eleven feet six inches. Girth at the swimming paws thirteen feet. Tail seventeen inches deep, and four feet nine inches across from tip to tip.

I had no opportunity of determining its sex, but was informed that it was a female.

The above description was taken from a whale captured in the lower bay of New-York in 1822.

THE NORTHERN RORQUAL.

RORQUALUS BOREALIS.

Balæna tripinnis maxilla inferiore rotunda. SIBBALD, Phalainologia, Tab. 3.
Balæna boops, Lacépède. MITCHILL, Med. Repos. Vol. 7, p. 416.
Broad-nosed Whale. SCORESBY.
Rorqualus borealis. KNOX, Nat. Libr. Vol. 6, p. 125, pl. 5.

Characteristics. Baleen divided into four or five thousand plates. Larger than the preceding. Vertebræ 65. Length 50 – 105 feet.

Description. Body not cylindrical, but compressed on the sides, and angular on the back. Head smaller than in *Balæna*. Dorsal elevation very small, triangular, opposite to the vent. Swimming paws placed far back, long, slender, and pointed at the tips. Baleen 314 plates on each side, extending about fifteen inches, and succeeded by a great number of smaller plates, gradually changing to bristles. Vertebræ 65. The largest vertebræ are 14 inches in the diameter of their bodies, and from 6 – 7 feet from tip to tip of their transverse processes.

Color. Uniform black above, light beneath. Folds pale white, occasionally reddish.

These two species resemble each other so much as to have been confounded together, until the careful examination and comparison of two recent specimens enabled Dr. Knox to establish their specific differences. The species is introduced here upon the authority of Dr. Mitchill, who has furnished a very brief notice of a large whale exhibited in New-York in 1804. It grounded, and was captured near Reedy Island in the Delaware. The following is all the information furnished: "Length 38 feet; circumference 18 feet; expanse of the jaws at the "extremity, 8 feet. No teeth in either jaw. Whalebone one to two feet long in the upper "jaw, of a grey hairy appearance." This is very meagre, but is enough to indicate that it should probably be referred to the above species. That it was clearly not the young of the Right Whale, *B. mysticetus*, is manifest from the absence of a dorsal elevation, which led Mitchill to refer it to the *B. boops;* while its size and the peculiar appearance of the baleen, would lead us to arrange it under the present species. It was a young individual.

(*EXTRA-LIMITAL.*)

Rorqualis australis. In 1837, the skull of a large whale was exhibited in New-York, under the imposing name of "Fossil Head of the Sea Serpent." It was reported to have been dug up near the Balize, Louisiana, and was in the condition of a graveyard bone. It had been probably stranded,

and subsequently covered by the rapidly forming sediment of the Mississippi. The lower jaw was wanting. The skull, with the upper jaw, was perfect, and measured fifteen feet. After a careful examination and comparison, it was identified with the *Rorqualis australis*, or *Balænoptera* of the Cape of Good Hope, described and figured by Cuvier (Oss. Foss. Vol. 5, part 1, p. 370, pl. 26, figs. 1, 2, 3, 4). A reduced figure, from a larger one taken on the spot, will be found on Plate 33, fig. 4.

FAMILY III. DELPHINIDÆ.

Teeth in both jaws, often numerous. No baleen. Other characters in common with the preceding family. Gregarious.

Obs. Sixteen species, included under seven genera, belong to this family. They are generally small, but some of them equal in bulk the largest of the preceding family.

GENUS GLOBICEPHALUS. *Lesson.*

Head globular; the rostrum not produced. Mouth subterminal, beneath. A dorsal eminence resembling a fin. Spiracle single.

Obs. This small group contains at present two living and one fossil species. On our coast, we have frequently

THE SOCIAL WHALE.

GLOBICEPHALUS MELAS.

PLATE XXX. FIG. 3.

Delphinus melas. TRAIL, Nicholson's Journal, Vol. 22, p. 81, 1809, figure.
D. globiceps. CUVIER, Mem. Mus. Vol. 19, p. 1, 1812, figure.
D. deductor. SCORESBY, Arct. Regions, Vol. 1, p. 496, figure.
D. intermedius. HARLAN, Ac. Sciences, Vol. 6, p. 51, pl. 1.
Phocena globiceps. SAMPSON, Am. Journal, Vol. 23, p. 301, figure.

Characteristics. Uniform black above; lighter beneath. Teeth varying from 18 – 28 in each jaw. Swimming paws long and pointed. Length 15 to 20 feet.

Description. Body cylindrical, tapering to the tail, and ending in front in an obtuse globular head. Upper jaw somewhat advanced before the lower. Teeth equidistant, sharp, conical, incurved at the point, the largest eight inches in length; they are not apparent in the young, and appear to vary in number with age. In an adult specimen, they were 28 in each jaw. Spiracle single, and placed on the back of the head. Sides of the tail carinated; the tail itself strangulated at the base. The dorsal eminence triangular, broad at base, sixteen inches high, immovable, and placed six feet from the mouth. Swimming paws long, narrow and tapering, sixteen inches in length.

Color. Shining, bluish black above. A narrow space extending from the throat to the vent, of a light grey color.

Length twenty feet.

The dimensions here given, were from an adult of the largest size. This cetaceous animal, so remarkable for its loud cries when excited, has received in our country various popular names. It is called *Black Whale-fish*, *Howling Whale*, *Social Whale*, and *Bottle-head*. It resembles the Grampus in size, and is probably often confounded with it. It appears to have been first noticed by Egede in his History of Greenland, and subsequently figured by Duhamel (Hist. Poiss. pl. ix. fig. 5). They are often seen in large herds, which, from some cause as yet unexplained, are frequently stranded, and perish on the coast. The books are full of instances of such occurrences on the shores of Europe, more particularly in the high northern latitudes. At Wellfleet, near Cape Cod, in 1822, a herd of one hundred of these social whales, varying in length from ten to fifteen feet, were stranded and captured. In the cotemporary newspaper notices, it was stated that they had been formerly numerous on that coast, but had not appeared there for many years. In September, 1823, a single one was taken in Salem harbor, and described by Dr. Harlan as *Delphinus intermedius*. In October, 1832, another individual came ashore at Fairfield beach, Connecticut, and was described by Mr. Sampson. In 1834, I received an account of the capture of two others on the east end of Long Island. The details furnished on that occasion enabled me to refer them with exactness to this species.

GENUS PHOCÆNA. *Cuvier.*

Head rounded, not much elevated. Mouth terminal. Snout short and rounded. Teeth varying in number. Dorsal eminence as in the preceding. Usually of a small size. Gregarious. Piscivorous.

THE COMMON PORPOISE.

PHOCÆNA COMMUNIS.

Delphinus phocæna. LINNEUS. GMELIN.
Porpesse. PENNANT, Brit. Zool. Vol. 3, p. 93.
D. phocæna. DESMAREST, Mammalogie, p. 516.
Sea Swine. GODMAN, Am. Nat. Hist. Vol. 3, p. 69.

Characteristics. Under jaw slightly longest. Twenty to twenty-five teeth on each side in both jaws, straight, compressed, and rounded at the tips. Length 4 to 5 feet.

Description. Body elongated, tapering towards the tail. Skin smooth. Snout short and obtuse. Eyes small, and placed behind the angle of the mouth. Auditory hole very small. Spiracle single, on the top of the head over the eyes, crescent-shaped, with its concavity

directed forward. Dorsal eminence broad, triangular, and nearly in the centre of the body. Swimming paws placed very low down, moderate, oval and obtusely pointed. Tail lunated.

Color. Dusky bluish black above; whitish beneath, the two colors meeting on the sides. Swimming paws of the color above.

Length four to five feet.

The Porpoise, or Porpess, is common in our rivers and bays, chiefly in the spring and summer months, when they appear in the train of the migratory *Clupidæ*, among which they make great havoc. This species has been confounded with another cetaceous animal of the same name, which is very rarely seen unless in the ocean off soundings. We allude to the *Delphinus delphis*, or *Sea porpess*, the Dolphin of the ancients. The common porpoises were formerly so abundant on the shores of Long Island, as to have induced the inhabitants to form establishments for their capture. In the Transactions of the Society in the State of New-York for the promotion of Agriculture, Arts and Manufactures, 4to. N. Y. 1792, will be found a paper by E. L'Hommedieu, on the manner of taking porpoises at the east end of Long Island. A seine is prepared about five hundred feet long, with cords about the size of ratlin stuff; the meshes are about nine inches square, and the seine from twenty to thirty feet deep. Tight casks of the size of ten gallon kegs, are used as buoys. The seine is then set parallel with the shore, at the distance of eighty rods, and secured by anchors at each end. Two other seines are made of large codline, with the meshes six inches square. These are put in separate boats on the shore, opposite each end of the larger seine. Porpoises go in scholes, and in following the small fish, come between the shore and the great seine. As soon as they reach the middle of the seine, the boat at the far end heads them off, throwing out the light seine from the shore to the end of the great seine, to which it is fastened; when both are thus fastened, and the anchors raised, the porpoises are imprisoned. Opposite the great seine, and parallel with it, on the shore, stout stakes are driven in about three rods apart, and a capstan placed at each. The small seines are drawn in, and the boats are sent outside. As soon as the porpoises find themselves confined, and the water becomes shoal, they throw themselves against the bag of the seine with so much force, that it is necessary to ease the capstan to prevent the ropes parting. As soon as this is over, they do not make a second attempt, but become so gentle that the men wade in among them, and put a slip-noose over their tails, or secure them with harpoons, and drag them ashore: there they are all speedily despatched. The blubber, for which they are principally sought, varies from one to two inches in thickness, and yields upon an average six gallons of oil per porpoise. The blubber is cut through on the back and belly, and is peeled off in halves; it is then scraped off with an instrument resembling a currier's knife, and the skin sent to the tanner. The leather made from this skin is said to be the strongest known, and is used more particularly for the upper leather of boots and shoes.

The word *porpoise*, or *porpesse*, comes to us from the Latin through the French, *Porcpoisson*. *Grampus* has a similar origin.

THE GRAMPUS.

PHOCÆNA ORCA.

PLATE XXXII. FIG. 1. LOWER JAW AND TOOTH.

Delphinus orca. FAB. Faun. Grœnl.
Killers. DUDLEY, Phil. Trans. 1719, p. 256; Abridg. Vol. 7, p. 424.
D. gladiator et *orca.* LACEP. Vol. 15, p. 1. BLOCH, Poiss. Vol. 10, p. 93 and 96.
Grampus. HUNTER, Phil. Trans. 1787, pl. 16.
Grand-poisson, Grapois and *Grampus,* of the Normans and English.
Killer and *Thrasher,* of the American sailors.

Characteristics. Upper jaw longest. Teeth conical, bent at their tips; eleven on each side, above and below. Length 20 – 25 feet.

Description. Body thick in proportion to its length, oval. Snout short and obtuse. Lower jaw broader than the upper. Teeth unequal, varying in number with age, but usually twenty-two in each jaw, and larger than in any other species of this genus. In the right side of a lower jaw which I had an opportunity of examining, the teeth were four inches long, and projected two inches beyond the sockets; the upper portion conical, with blunt points directed inward and backward; the lower portion just above and within the sockets, compressed transversely, one and a half inches in diameter, in the other direction not exceeding one inch: all the teeth contracted at their bases. The dorsal elevation, miscalled a fin, is placed nearly on the middle of the body, pointed at the tip, and nearly four feet high. Swimming paws broad and oval. Tail lunate.

Color. Glossy black above; white beneath, the two colors separated by a well defined but irregular line. Occasionally a round or oblong patch of white above or behind the eye.

Length, 20 – 25 feet.

The Grampus, Finner or Black-fish Whale, under which different names it is known to our fishermen, was formerly numerous on our coast, when the Right Whale was also abundant. I have seen them off the coast of Long Island, on several occasions. Paul Dudley, in an essay on the Natural History of Whales, in the English Philosophical Transactions, notices this species as the natural enemy of the whale: "Our whalemen have given this fish the "name of *Killer.* These killers are from twenty to thirty feet long, and have teeth in both "jaws, that lock one within the other. They have a fin near the middle of the back, four or "five feet long. They go in company by dozens, and will set upon a young whale, and will "bait him like so many bulldogs." The grampus is doubtless a voracious animal, living upon various large fish, and even seals and porpoises have been found in their stomachs; but the stories of their attacking whales in packs, will perhaps require confirmation by competent authority. They are very sportive in their habits; and perhaps a large herd of them together, engaged in chasing and tumbling over each other, may have suggested to the lovers of the marvellous the idea of being occupied in attacking a whale. The grampus furnishes an excellent oil.

GENUS DELPHINUS. *Linneus.*

Head more or less rounded, and separated from the elongated beak by a distinct furrow. Teeth numerous. Dorsal eminence as in the preceding.

THE SEA PORPOISE.

DELPHINUS DELPHIS.

PLATE XXXI. FIG. 1.

Delphinus delphis. LINNEUS, 12 Ed. p. 108.
D. delphis. DESMAREST, Mammalogie, p. 514.
The True Dolphin. GODMAN, Am. Nat. Hist. Vol. 3, p. 58.

Characteristics. Teeth forty to forty-eight on each side, above and below, slender, subequal, slightly bent, pointed. Length 6 – 8 feet.

Description. Body cylindrical, tapering, with a smooth, hard coriaceous skin. Eyes small, low down, and near the angle of the mouth. Spiracle single, on the summit of the head, above the eyes. Beak the length of the head. Teeth subequal, equidistant, interlocking with each other, somewhat larger towards the posterior part of the jaw. Swimming paws placed low, longer than broad, half way between the end of the beak and the dorsal eminence, subfalcate. Dorsal eminence triangular, curved backward, ten inches high, and nearly the same at base. Tail lunate, with two long pointed lobes.

Color. Dark greenish black above; white beneath, and greyish on the sides.

Length 6 – 8 feet.

The name of *Dolphin*, which is applied to this animal, is also given by sailors to a species of fish. This is the true Dolphin of the ancients, concerning whose docility and fondness for music such marvellous stories have reached us. I am indebted to Mr. Audubon for an opportunity of presenting the accompanying figure, reduced from a sketch made by him of an individual six feet long.

The Sea Porpoise is generally seen in large herds. Upon one occasion, I saw during a storm a troop of these animals. They swam abreast of each other, and the line extended nearly a mile. Their movements, as they sprang over a wave, were very beautiful. They are exceedingly ravenous, living upon all the gregarious tribes of fishes. They rarely approach soundings, unless in pursuit of their prey.

(*EXTRA-LIMITAL.*)

D. calvertensis, Harlan. (Fossil.) From the Maryland tertiary. (See Bulletin Nat. Instit. Washington, No. 2.)

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Nat size

Fig 2

J. Wells

Lith of Endicott New York

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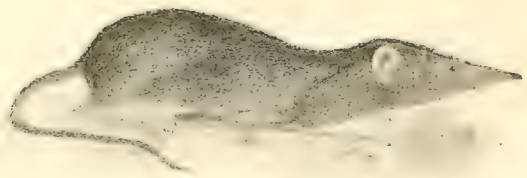

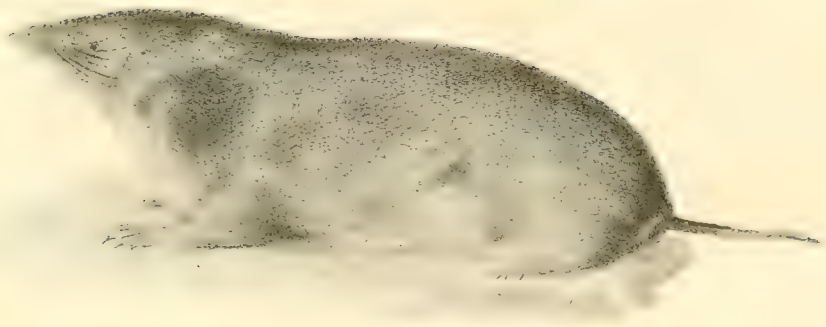

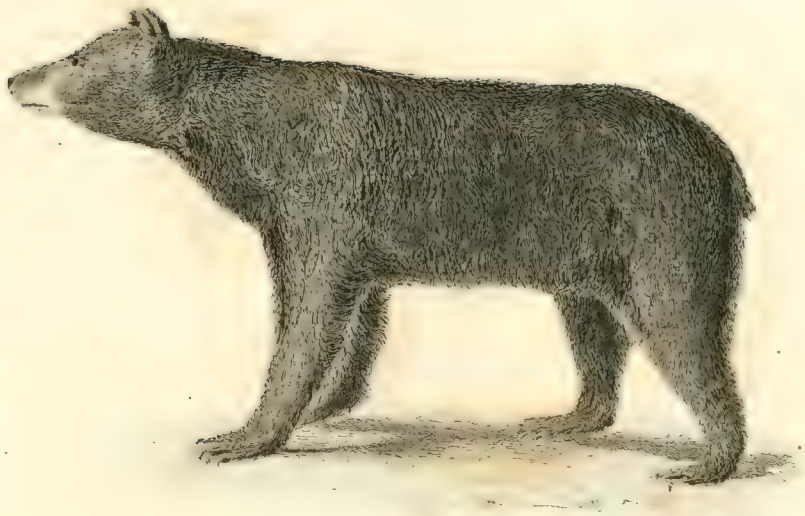

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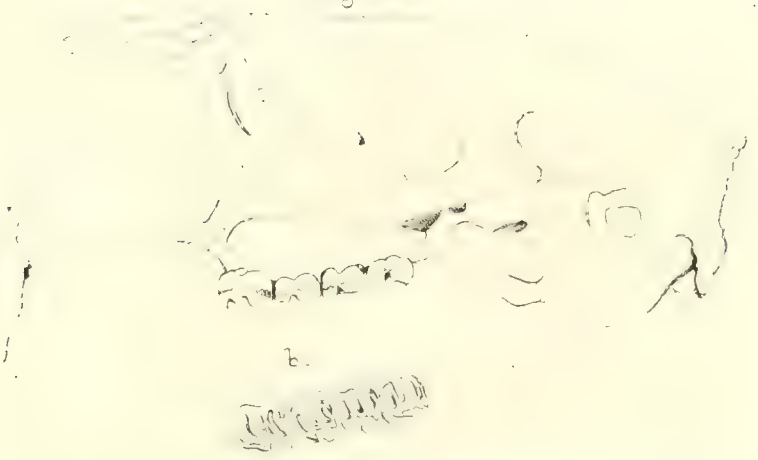

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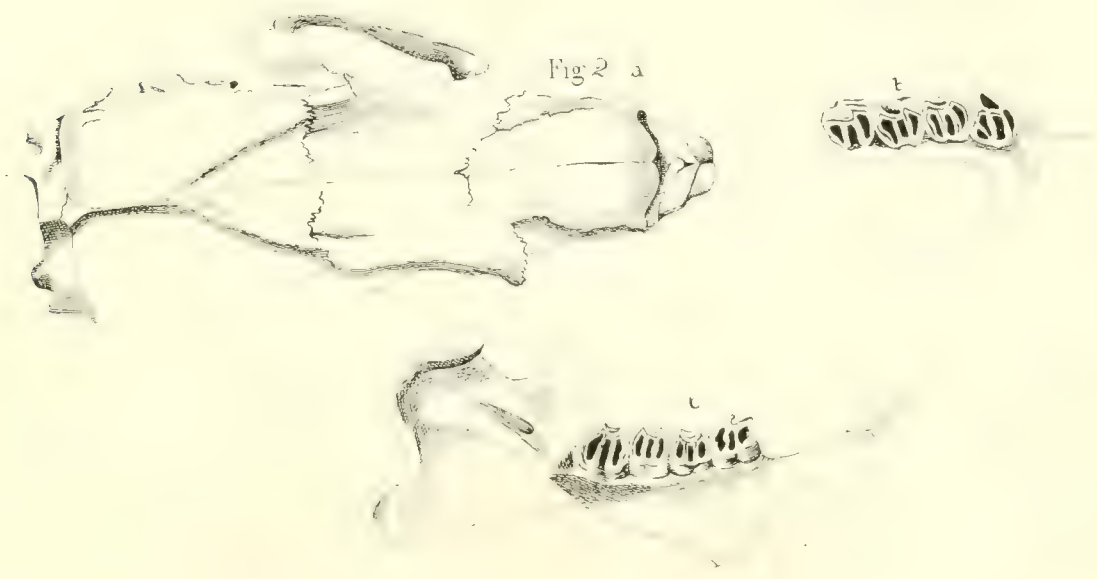
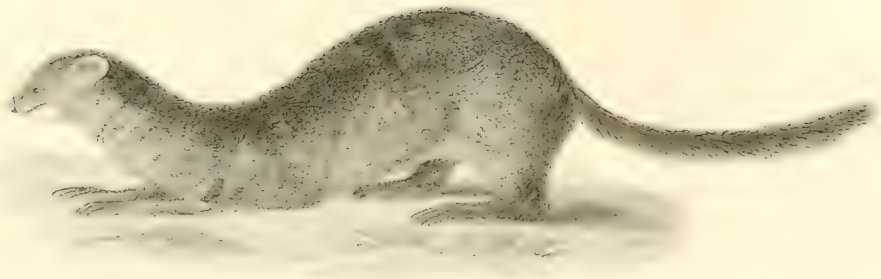
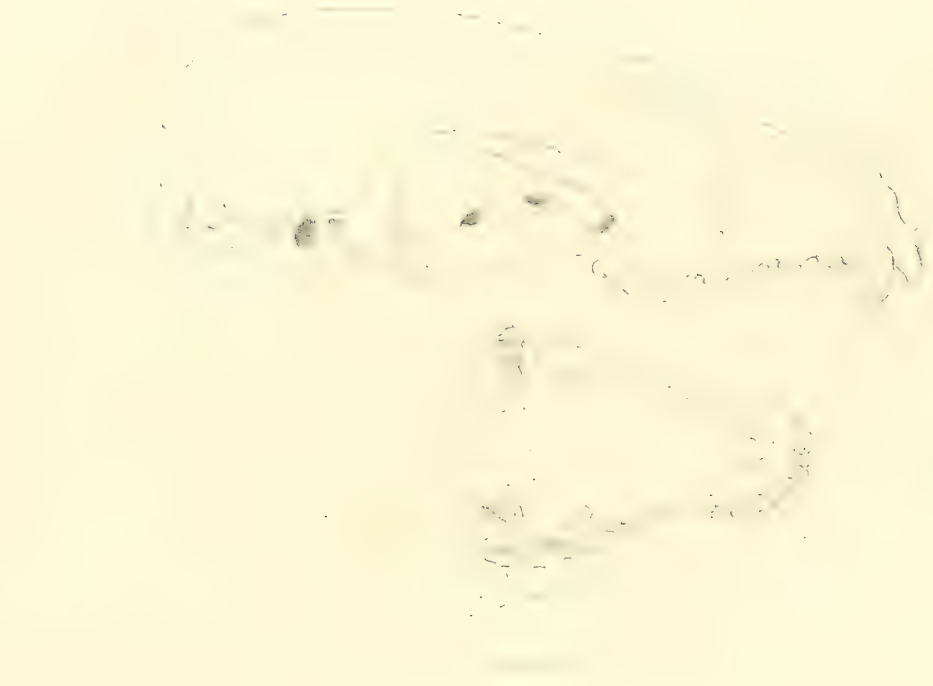
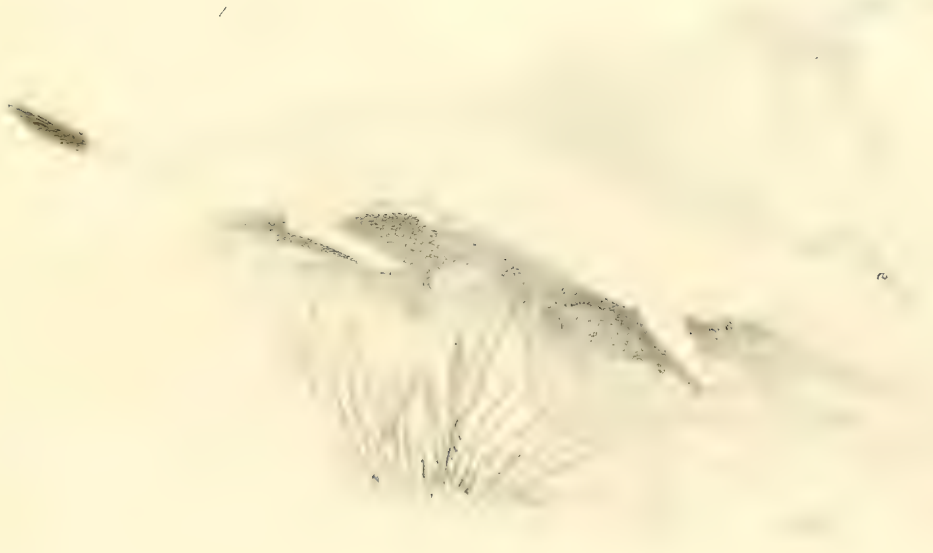


Fig 3 a

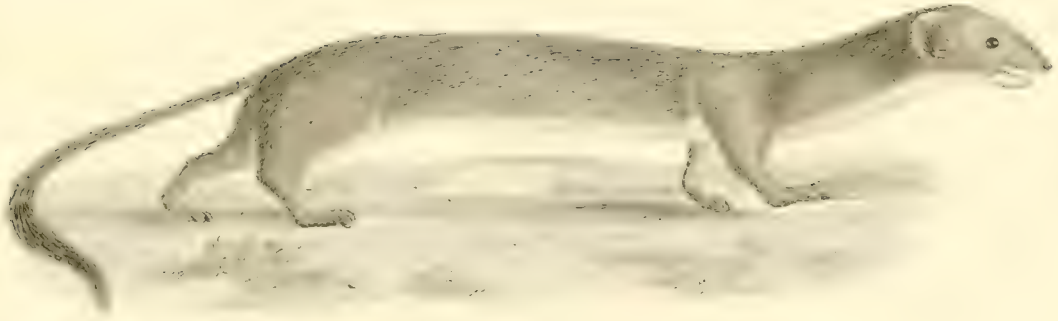
Fig. 1

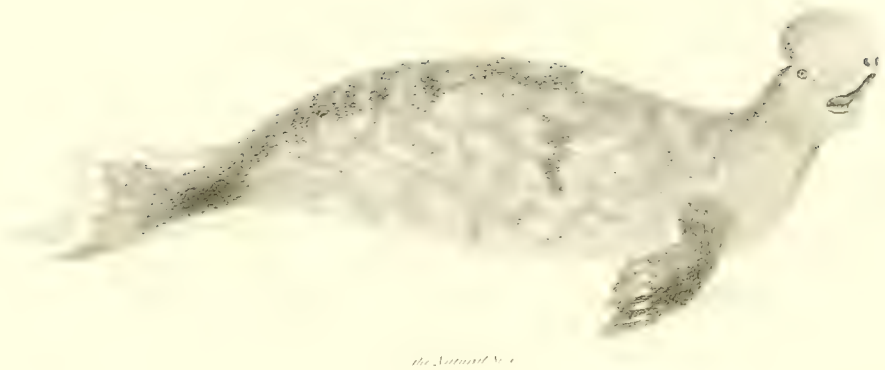






J. J. Audubon del.





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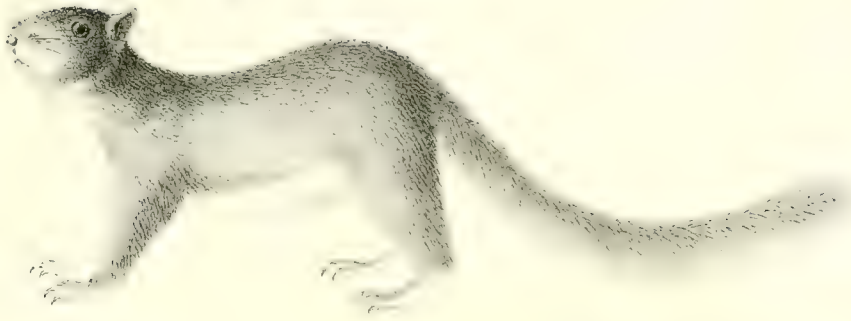


½ Nat size

Fig 2

½ Nat size

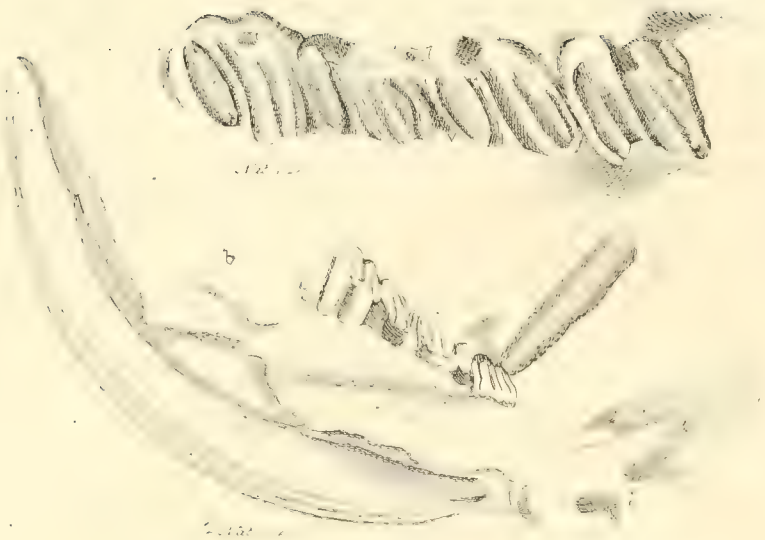
Fig 3

2.5 Nat. size

Lith. of Endicott New York

Plate 16.

Fig 5 a



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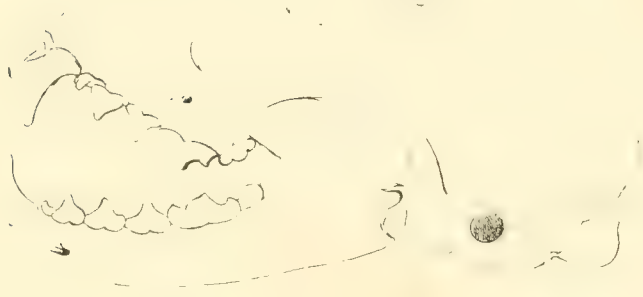

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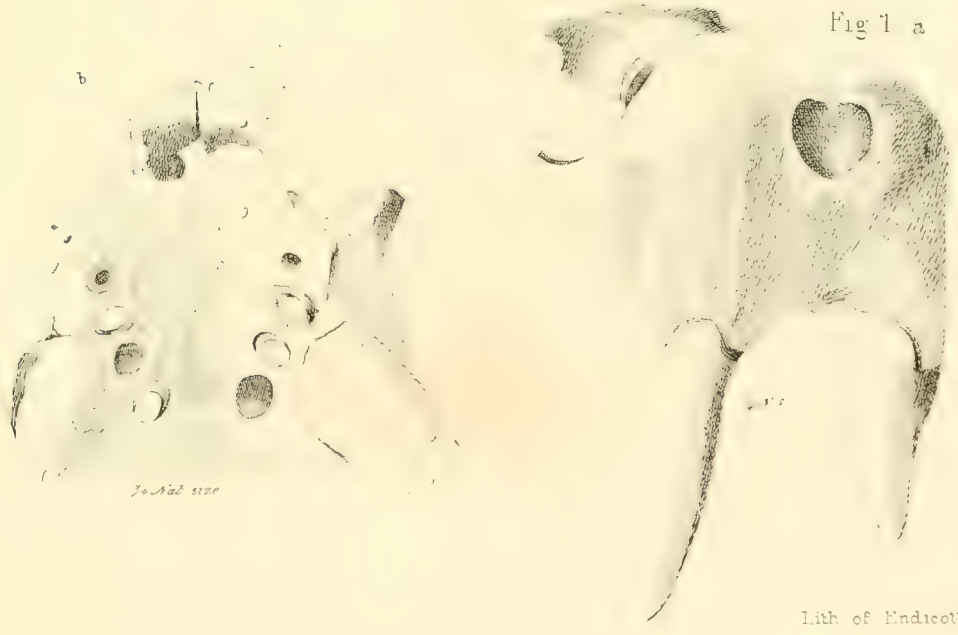

J.W. Hill.

Lith. of Endicott New York

Fig. 1

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Fig. 2

Fig. 3

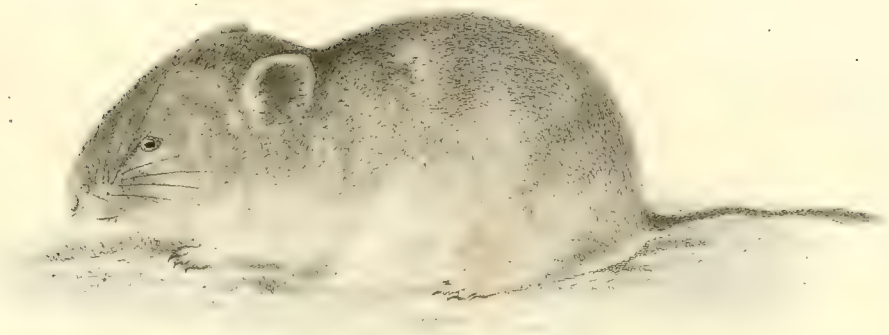
Fig. 4

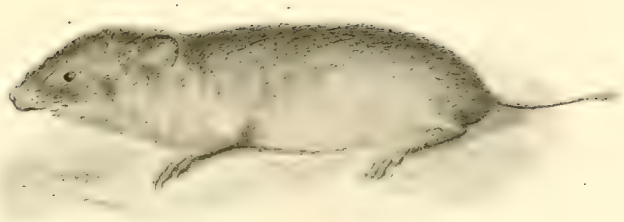
⅓ Nat. size.

J.W.Hill

Lith. of Endicott, New York

Fig. 1





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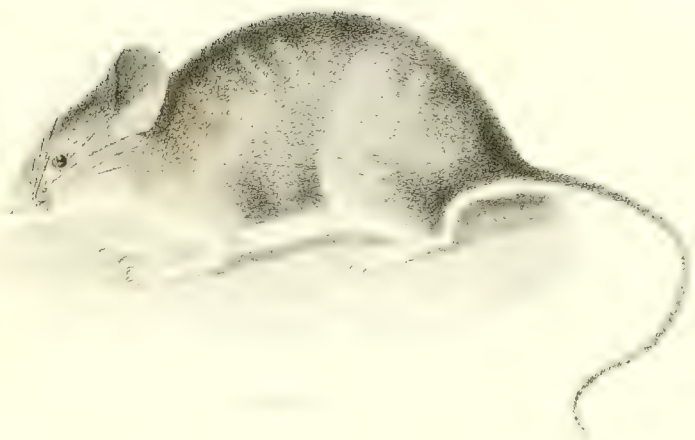

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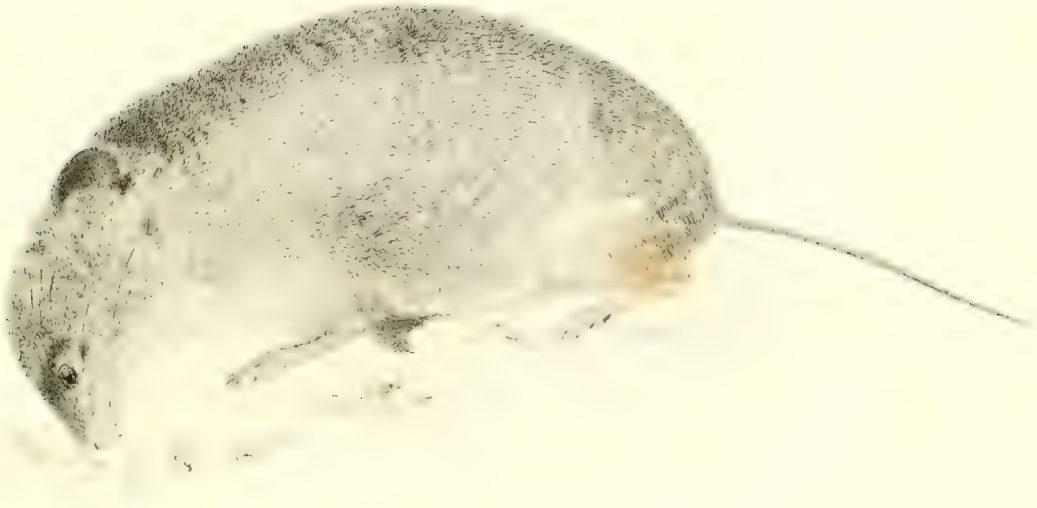

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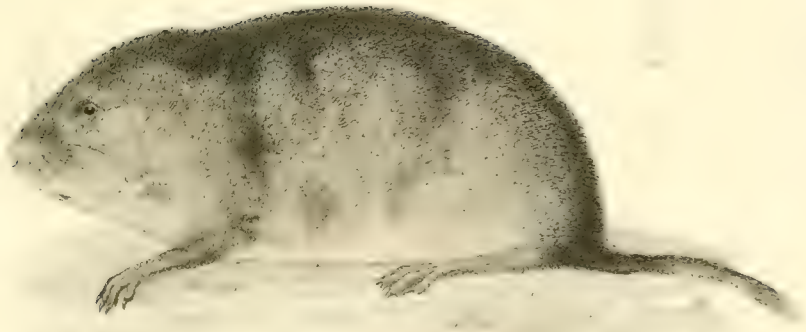


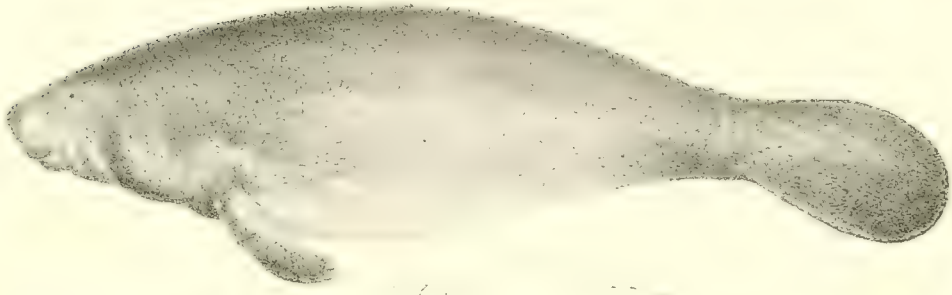
Natural Size

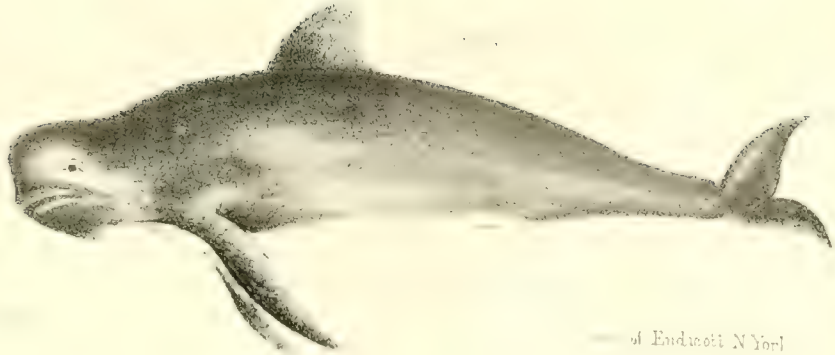
Front View

Posterior View

Side of the Animal

Plate 31





of Endicott N York

Fig 1

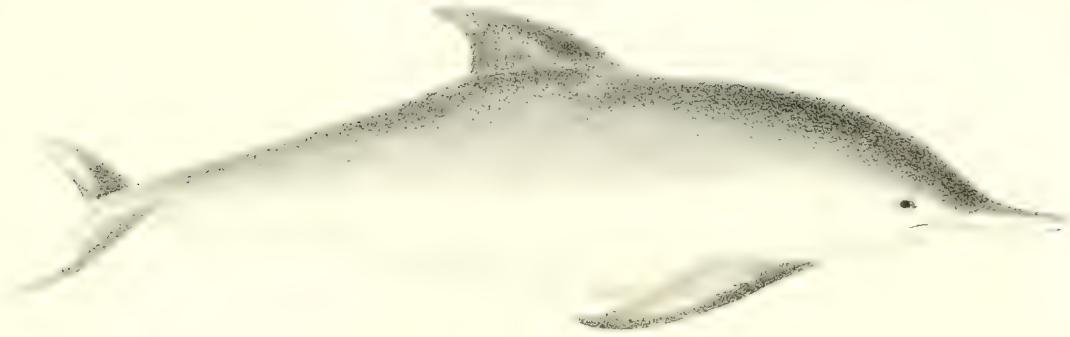


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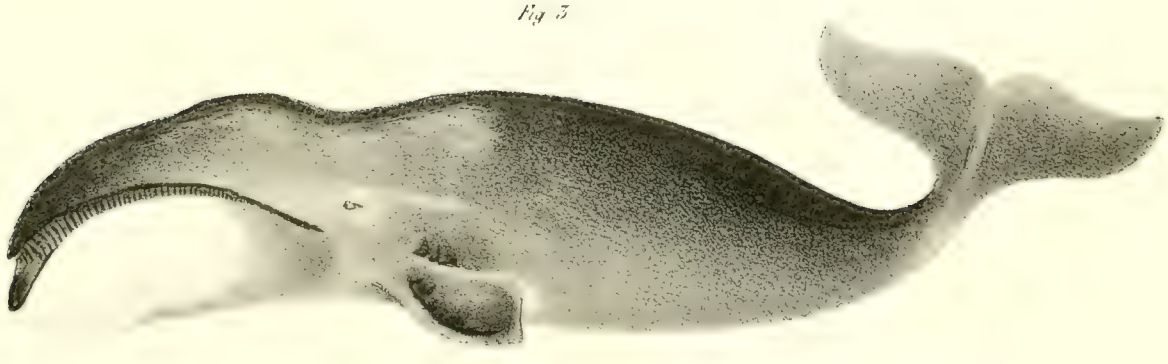
Fig 2

Fig 3



J.W. Hill

Lith of Endicott New York

Plate 37

Fig. 1. a

½ Nat size

Fig. 1

½ Nat size

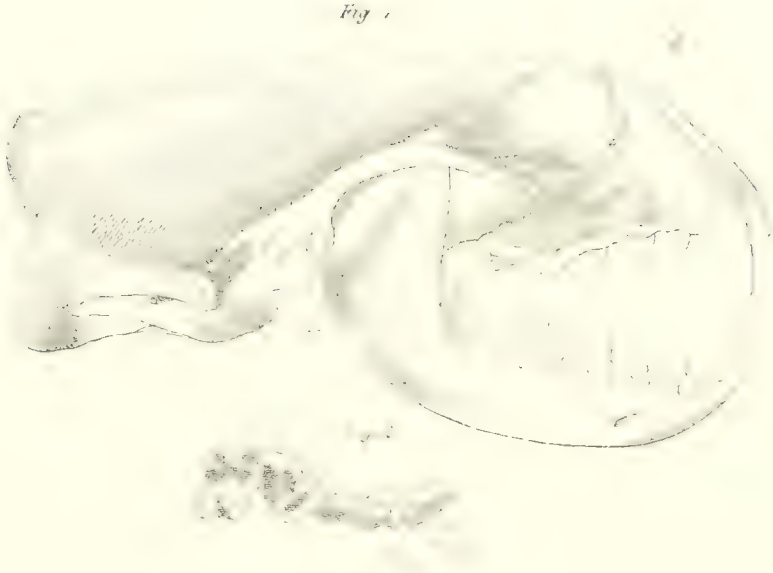
Fig. 2

Fig. 4

⅓ Nat size

⅓ Nat size

Fig. 1



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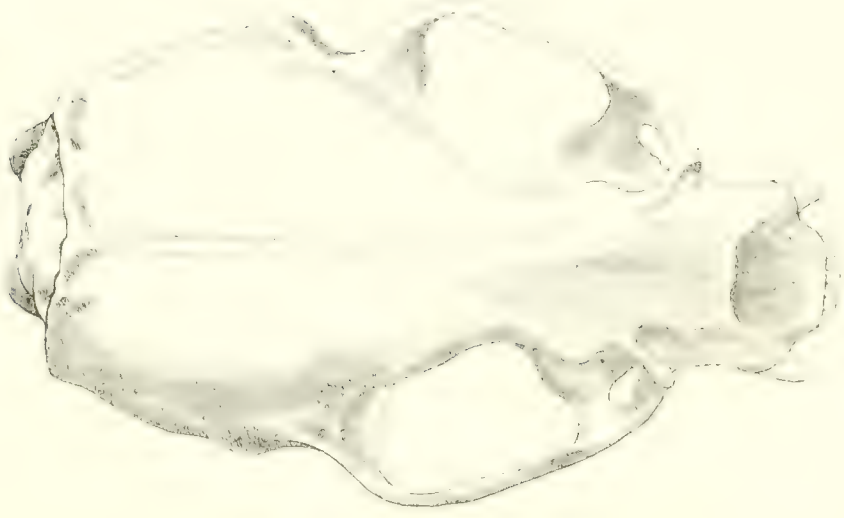
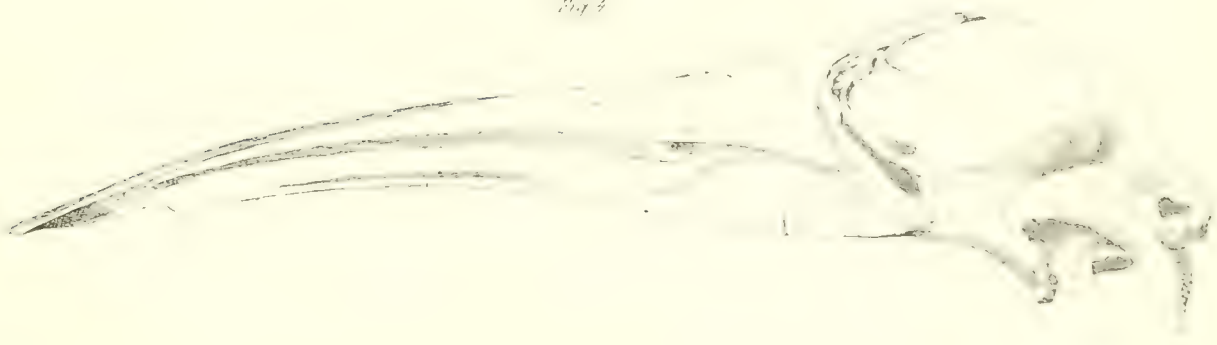


Fig. 4



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